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timex sinclair user

Issue #1
COLLECTOR'S ISSUE

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Here comes the T/S1500

Eight pages of programs

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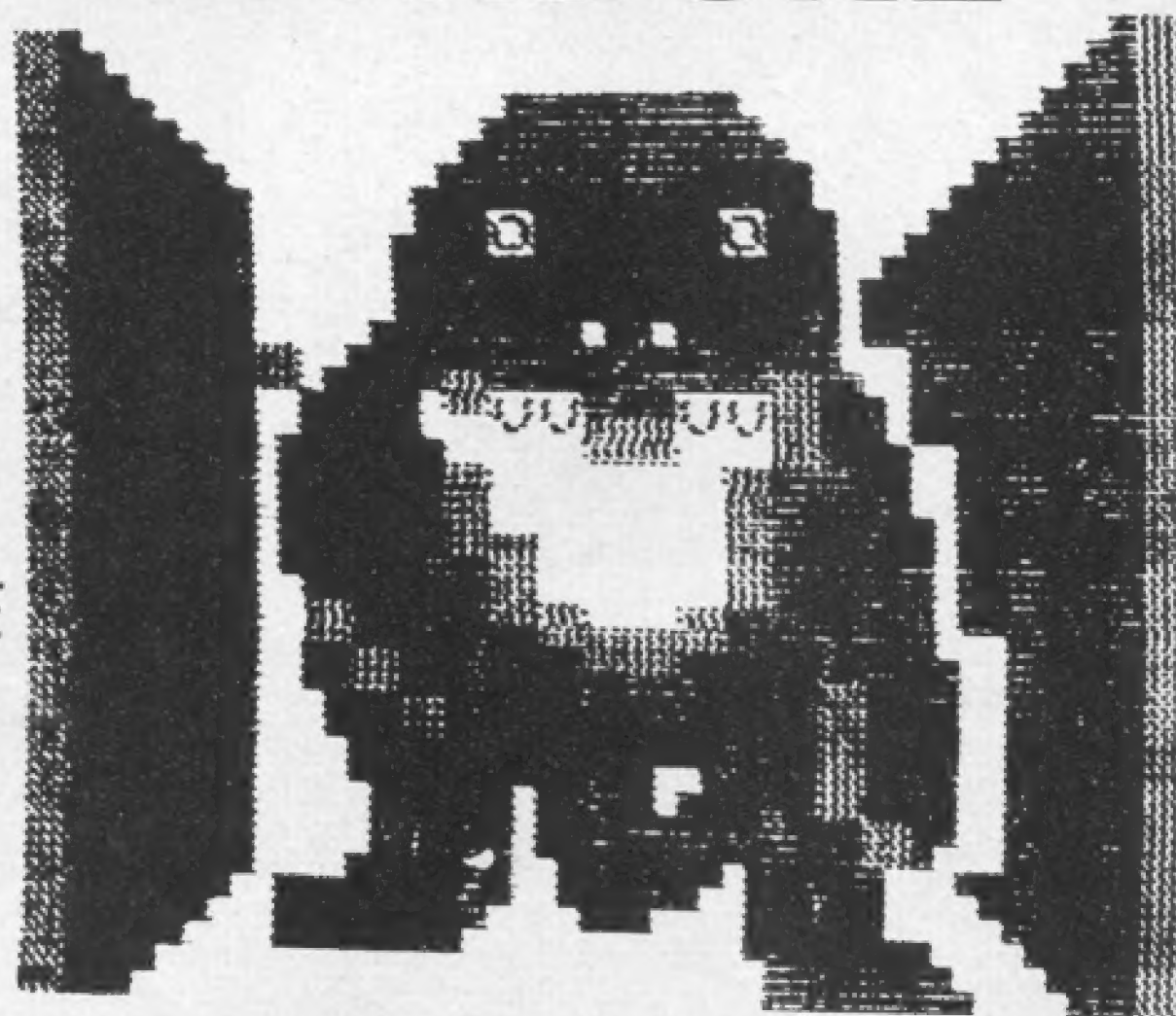
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Timex Sinclair User is published monthly by ECC Publications Inc. in conjunction with C.W. Communications.

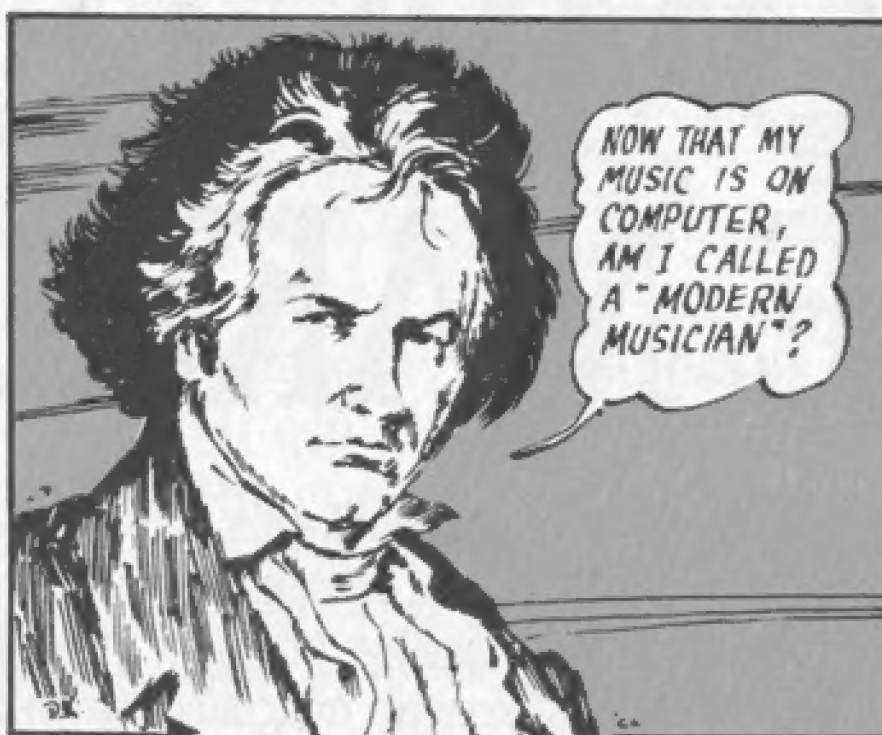
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Timex Sinclair User
ISSN 0737-0881
Typesetting by
International Typesetting
Advertising manager
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An all-purpose voltage and temperature measuring system (Votem); an add-on that teaches your computer to say "Good morning!"; and more

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- A full listing of national user groups and much more!

TIMEX MAKES THE COMPUTER, BUT WE MAKE IT TICK.

If you own a TS-1000 or ZX-81 computer and want to bring out the power within it, you'll want Memotech. From easier input to high quality output and greater memory, Memotech makes the add-ons you demand. Every Memotech peripheral comes in a black anodized aluminum case and is designed to fit together in "piggy back" fashion enabling you to continue to add on and still keep an integrated system look.



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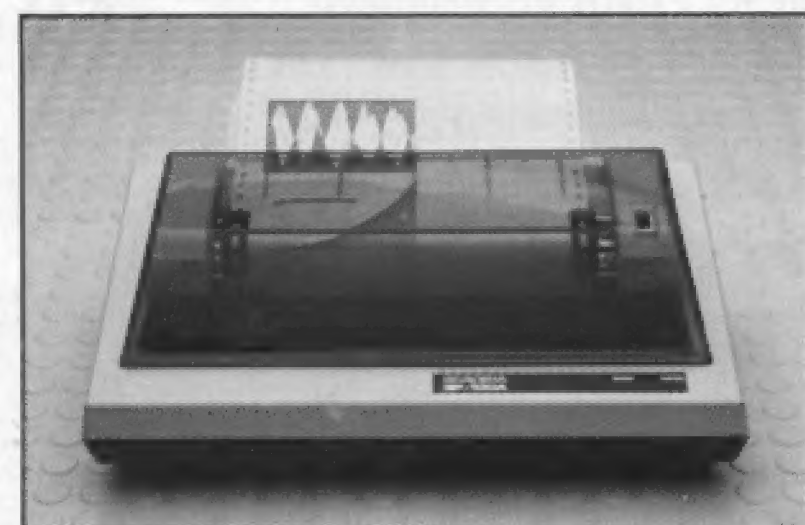
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interface. Other printer packages are also available through Memotech.

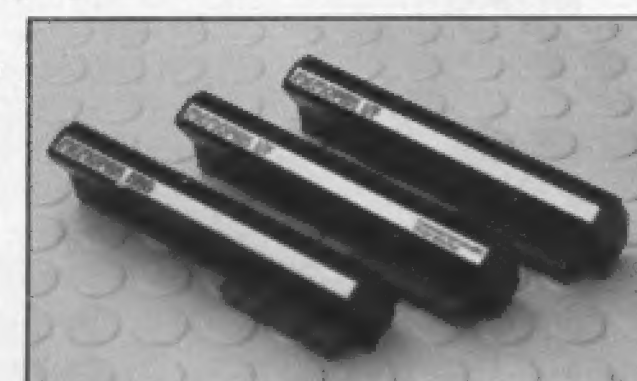
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TIMEX SINCLAIR USER

What Can You Expect?

WELCOME to the first issue . . . the collector's issue . . . of TIMEX SINCLAIR USER, the independent magazine which aims to help you make the most of your machine. Look to TIMEX SINCLAIR USER each month for enjoyment, information, and uses for your machine and at least eight pages of programs! As well, each issue will include news of new products and events related to your computer, in-depth reports of new hardware and software, and reviews of available books. There will also be features and stories of general interest on how different people are using their computers for new and unusual applications.

This page will act as your view into the future; what's coming, what's being planned, what's new and



available for your machine. Through this page, we will give you a glimpse of the future, every month!

Even now, rumors abound about the new machines and add-ons that Timex and Sinclair will be introducing in the coming months. Last January, at the C.E.S. (Consumer's Electronics Show) in Las Vegas, TIMEX unveiled the T/S2000. It has color, sound, hi-res graphics and great (according to those who have used it) programming capabilities. And it's true, we've seen them, plug-in ROMs for the T/S2000. Perhaps this marks the end to your struggles with those long loading programs on sometimes unreliable tape recorders. It seems that ZX technology with cartridge convenience is just around the corner! Before this new computer hits the market, we will have all the details on it for you. Watch for our up coming T/S2000 features.

But even before the new T/S2000 comes on stream, which we hear will be the fall of '83, a new TIMEX SINCLAIR machine, the T/S1500, will make its debut. From what we have been able to learn, it is basically the T/S1000 with a built-in 16K RAM and a regular typewriter keyboard. This machine, too, will be taken apart and examined for you in an up coming issue.

On this page also, we will provide you with information and speculation on what is happening with Clive Sinclair and Sinclair Research. What about those rumors concerning a flat screen computer using ZX BASIC? It was spoken of as a "maybe" for 1983-84.

Our guess is that TIMEX will wait on that one until the T/S2000 is well and truly launched — an event we look forward to with great excitement! In any event, this page will keep you ready for the new, the exciting, the useful, and the interesting additions to the Timex Sinclair computer line.

The new TIMEX printer seems to have answered some of the complaints about the ZX printer put out by Sinclair. The new TIMEX printer still uses narrow paper (about 4.5 inches wide) and a 32 character line length (the same as the screen), but it does use regular, untreated paper. The image you get is clear, reproduceable, and very readable. The ZX printer uses thermal paper and often gave results that were less than good. TIMEX SINCLAIR USER will feature these and other printers for your computer in future issues.

On page 63, you will find a one-page article titled, "Starting Out." This page is designed to help the new user get started . . . with as little frustration as possible. It will appear every month. It will, we hope, invite those who join the ranks of new computer users to take the plunge and get involved with their T/S1000. If you feel there are ideas or tips we have omitted that would make it still easier for that new, first-time user, please let us know.

And while we're on about letters from you, we will be able to provide help and tips to all users. Write in



with your questions. If we cannot answer your question, we are sure that there is a reader out there who can and will. Further we welcome any new or special uses or ideas for the T/S1000, ZX81 you may develop.

This is probably a good time to deal with the confusion that may exist about the differences between these two machines, the T/S1000 and the ZX81. Fundamentally, they are the same machine. The ZX81 has 1K of user available memory, while the T/S1000 has 2K. All ZX81 peripherals work equally well on the T/S1000 and, of course, the reverse is true (provided the 1K memory difference is taken into account). With a 16K RAM added onto them, the two machines are virtually inter-changeable. Any software from one will run on the other. If at times we talk about the ZX81 the T/S1000, please read it as ZX81 AND T/S1000

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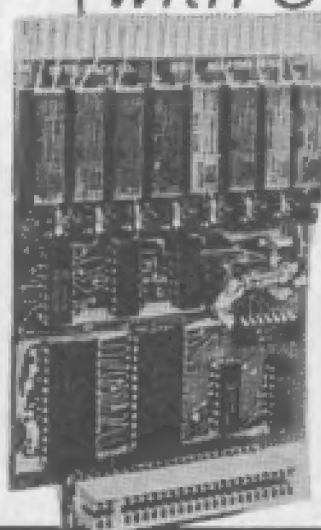
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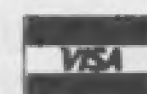
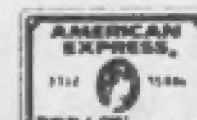
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Clive runs up \$200 million

CLIVE SINCLAIR is now officially worth more than \$200 million. The London placing of shares, announced at the launch of the Spectrum (T/S2000) has now been settled with a value of \$204 million being put on Sinclair Research, of which his

personal share is about 85 percent.

A number of unnamed financial institutions, believed to be about 30, have agreed to buy 400,000 shares at \$34 each, which is a total of \$20.4 million for 10 percent of the company. The sale was

heavily oversubscribed.

The latest figures available show that in the year to March, 1982 Sinclair Research made a profit of almost about \$20 million on sales of about \$55 million. It is expected that profit for the year to March

this year will rise to \$25 million. (This is an estimate.)

It is believed the company would like a full stock market listing within the next year.

Most of the money raised will be used to finance work on the Sinclair electric car.

The invasion of the U.K. softwarecrats

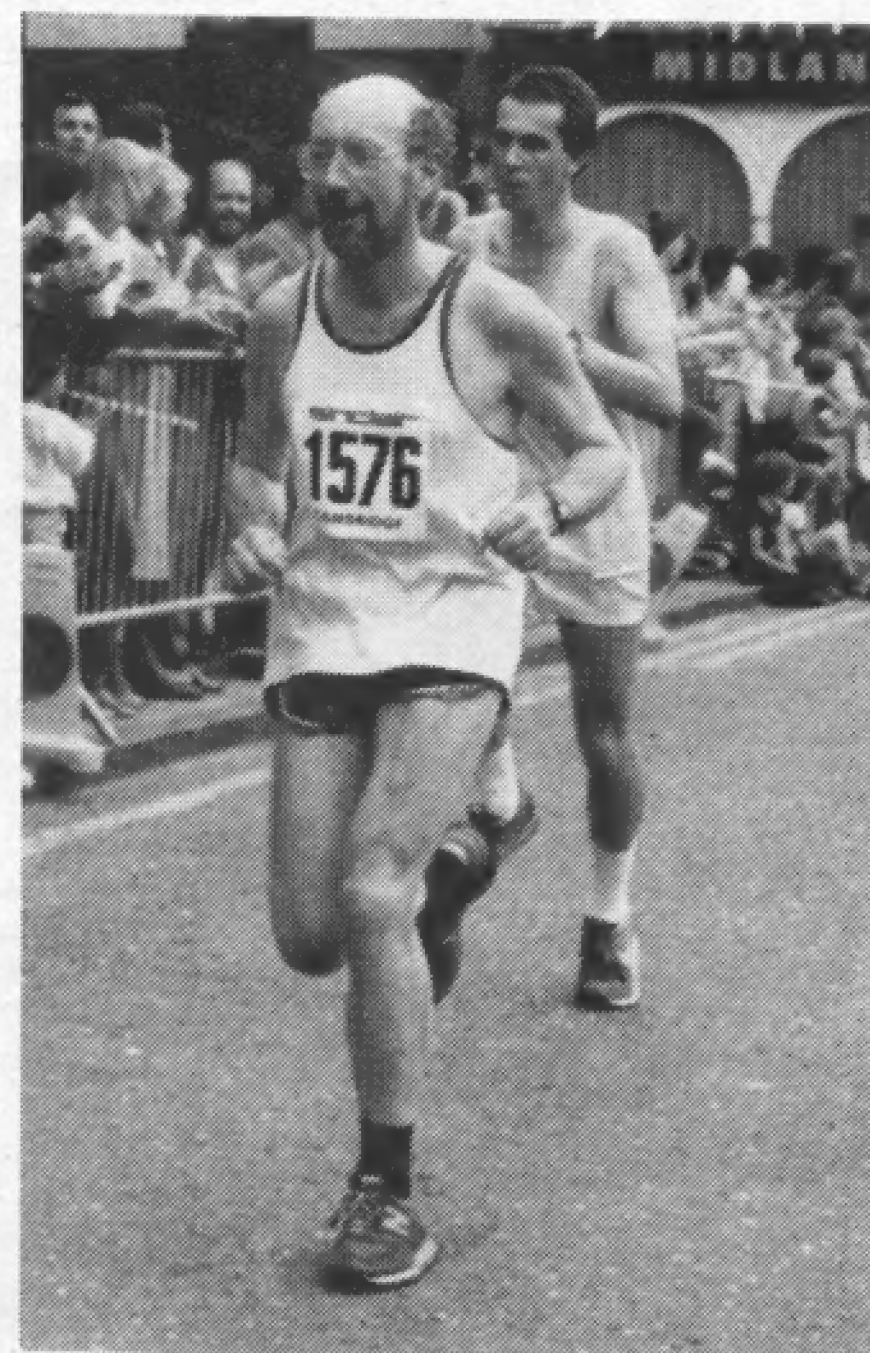
THE U.S.A. is the home of all new technology, right? Well almost right. When Timex and Sinclair introduced the affordable home computer, it was based on technology developed by Clive Sinclair and Sinclair Research. It had been out and in the hands of hundreds of thousands of enthusiasts in the U.K.

for over a year before we saw it over here. Over there, they had a huge jump on hard and software development. U.S. programmers had a year to make up.

For the first time in a long time, manufacturers were taking the trek over the Atlantic to bring those U.K. products to us. It was unusual, different and most certainly

beneficial. Companies such as Artic Computing, Psion, and Quicksilver have become quite well known here. Far from being a problem to us, it has allowed users here in the States to enjoy top-of-the-line programs right from the start.

Oh, by the way, this magazine first was seen in the U.K. as Sinclair User!



Clive in a marathon and in the money

Plan to visit these upcoming events

MAY 5-8	Anaheim Computer Showcase Expo, Anaheim, CA	5-8	International Summer Consumer Electronics Show, Chicago, IL
5-8	Washington Computer Showcase Expo, Washington, DC	6-8	National Educational Computer Conference, Baltimore, MD
10-12	Mini/Micro-Northwest, Portland, OR	9-12	Kansas City Computer Showcase & Expo, Kansas City, MO
12-15	San Diego Computer Showcase Expo, San Diego, CA	11-13	Houston/Produx 2000, Houston TX
19-22	Houston Computer Showcase Expo, Houston, TX		
		22-24	Dexpo/East 83, St. Louis, MO
		31-6/2	Canadian CAD/CAM & Robotics Expo & Conference, Toronto, Ont.
		JUNE 1-3	Montreal Computer Show & Conference, Montreal, Que.
		2-5	Seattle Computer Showcase Expo, Seattle, WA

Here comes the 1500!

FIRST they brought you the T/S1000! Next they promised the T/S2000! But from what we have been able to learn, the American public was not as accepting of the redone ZX81 (which is what the machine was originally called in the U.K.) and quite willing to wait for the more sophisticated machine. There were numerous complaints about the T/S1000's key board. Also many potential users felt the 2K user available memory was not enough, even though it was twice the memory found in the ZX81.

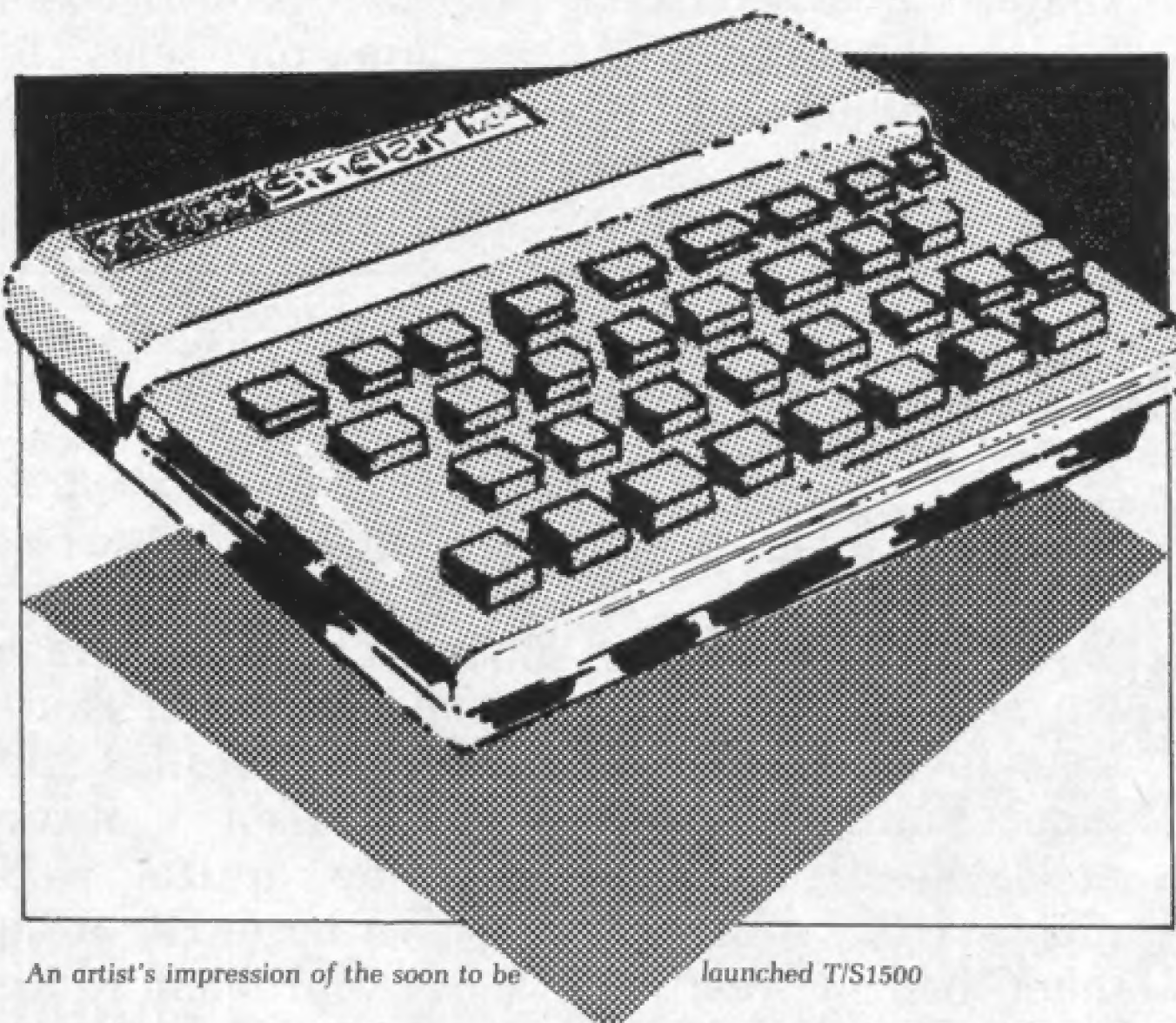
Timex has been quick to respond to these issues. On June 1, Timex plans to introduce their newest computer, the T/S1500. This new machine will be

Timex's answer to the critics. It will have a built in 16K RAM and will boast a regular type keyboard with moveable keys. This new machine will have the simplicity of

the T/S1000 plus the sophistication of the keyboard and the 16K RAM pack as "free add-ons."

From the limited information being given out by Timex, we have learned that this new in between machine will retail for about \$100.00; keyboard, 16K RAM pack and the computer all for \$100.00! That's a bargain! We hope they come through.

● News on the T/S2000 front is that it will be on the market "mid-year" according to Timex boss Dan Ross, in our exclusive interview appearing in this issue.



An artist's impression of the soon to be launched T/S1500

Sinclair's searching for super software

WITH MUCH media ado last April, Sinclair Research Ltd. licensed the Timex Corporation to sell its line of personal computers and peripherals in North America. Their first joint product, the Timex Sinclair 1000, hit the stores in August of last year and has been anteing up-market share in thousands of outlets nationwide ever since. With retail sales in good hands, what's Sinclair up to now?

To find out, we checked in with Maggy Bruzelius, director of Sinclair's U.S. offices in Boston. She reported the company sold its one millionth computer last month — quite remarkable for a company just a shade past its third birthday.

The U.S. office is continuing to provide service to ZX80 and T/S1000, ZX81 customers. Shipping headquarters in Nashua, New Hampshire are filling orders

for Sinclair Software, currently being advertised in several trade publications.

"We're also working as a clearing house for software in the States," said Bruzelius. "We're actively looking for GOOD programs that we could market in England and Europe."

Bruzelius said, "Specific software categories include games, household management and education. We're particularly intrigued

by solid adult education programs, in language instruction or how to play the stock market, for instance," she said.

The next home electronics product scheduled to skyrocket out of the Sinclair Laboratories is a flat screen television. It will feature a black and white screen with a built-in FM radio, and will operate anywhere in the world. The flat Sinclair TV will retail for less than \$100. ☺/☺

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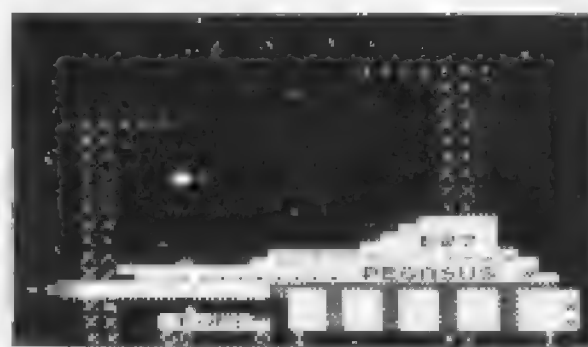


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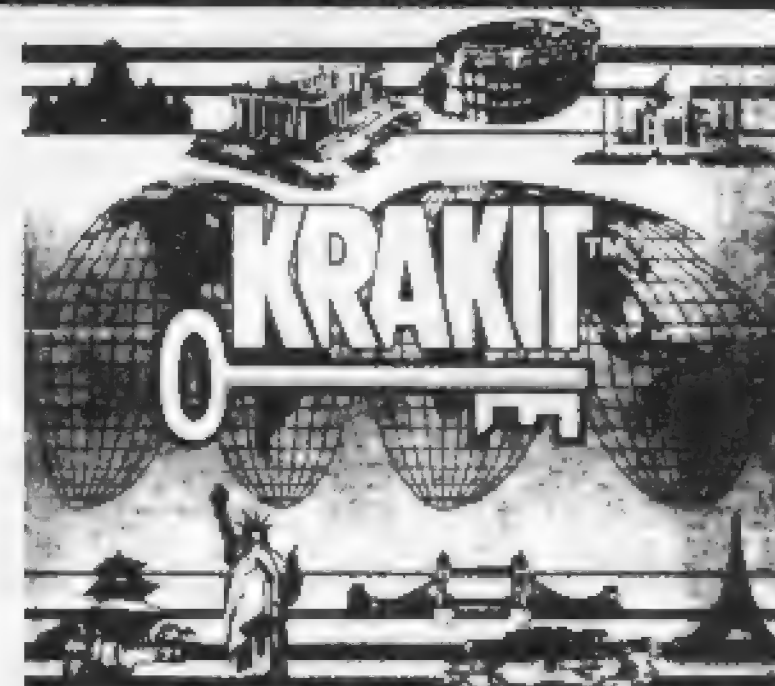
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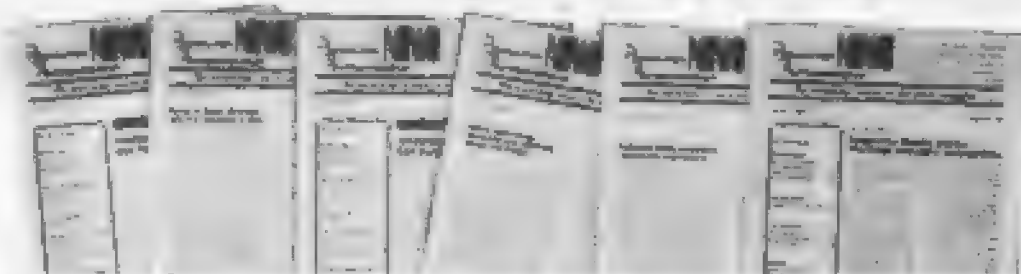
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Whatever your goal is - Silicon Valley Tycoon, or just a business at home - we guarantee you'll find a business to suit you - or your money back!

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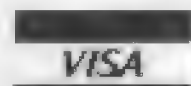
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Roll up for the ZX circus

EXHIBITIONS have long provided the many suppliers in the British Sinclair market with a popular outlet for their products.

With the majority of sales being conducted through mail order it provides a welcome opportunity for them to find out what their customers are thinking and what their competitors are doing. It also allows the customers to see the products working before they spend their money.

There is a wide range of events from which to choose. They are held at all times of the year and in all parts of the United Kingdom. There are the general shows usually held in London at which the whole range of home computers are on show including the Apples, Vics, Ataris and BBC machines as well as the Sinclairs. They attract crowds in the tens of thousands. The Personal Computer World show held last summer at the Barbican in the City of London attracted 70,000 people over four days.

At the other end of the scale there are the small local shows organized by computer clubs which attract a few thousand.

One of the unique features of the market for Sinclair Research machines in Britain has been the regular ZX Microfairs organized by Mike Johnston. All but one have been held in London and people from all over Britain have made the trip to the capital for the event.

"I became involved with the shows by accident" said Johnston. "At one of the early meetings of the National ZX Users clubs in 1981 some people came along to sell some things. Since this proved very popular, I suggested to the club that the idea be repeated with more exhibitors but they said they were too busy and suggested that I do it."

Mike imagined that the interest would be limited with between 12 and 15 exhibitors attracting about

T/S 1000, ZX81 fairs still popular

300 people. He quickly discovered that he had greatly underestimated the interest from suppliers and switched the venue to a much larger hall near the Houses of Parliament.

"I only took half the space that I could have and I was really worried that the 3000 people I expected would be lost," said Johnston.

He need not have worried. About 5,000 people crowded into the hall and he believes that many more were put off by the long lines and the crush in the hall.

A second show was held in January 1982 at which the space for exhibitors was doubled, but the crowd was almost twice that of the first show. People lined up for hours to get in and at one point it went twice round the large hall and a long way down a neighboring street.

Both these events were held in the early days of the Sinclair computers when the amount of the soft-

ware and hardware available was limited.

Johnston said: "One of the reasons for holding the shows was that the market was still young and there were a lot of exciting things being produced. I wanted to let people see what was happening."

Despite the growth of the shows since those early days he has attempted to keep this one of the main aims by keeping the organization simple and the cost of taking space small.

"I want to keep the prices down so that it encourages the small producer who may still have an interesting product to come along. I know many of the bigger companies make large amounts of money at the shows but they were small at one time. It was only because they were able to show what good products they had that they were able to grow."

The emphasis is on the informal with most of the exhibitors arriving the night before a show and the rest bringing their goods in on the morning. At the end of the day the stands are quickly dismantled. Johnston estimated that at each of his shows about \$200,000 of business is done.

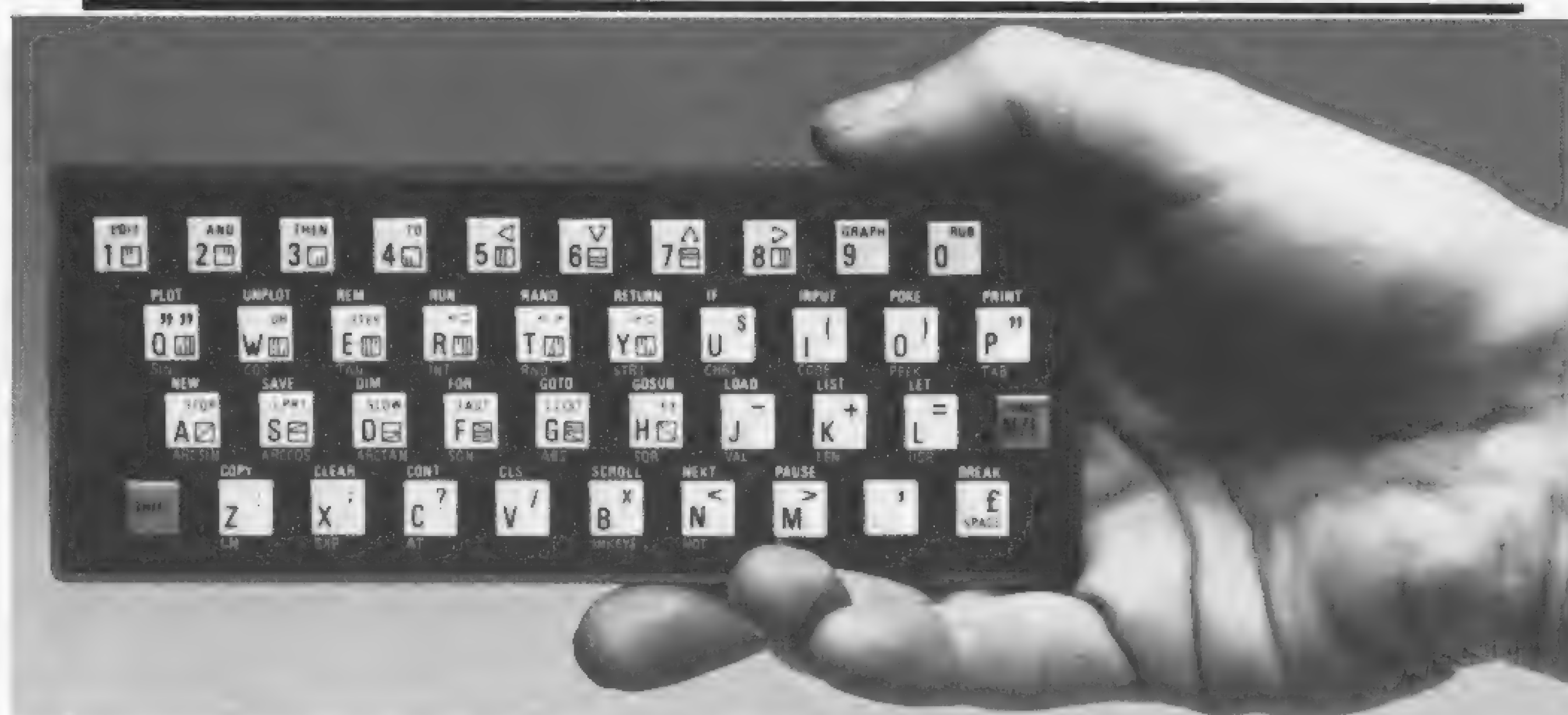
The shows are now so popular that most of the space is sold almost as soon as dates are announced.

The final sign of success is that there are a growing number of people throughout Britain more than willing to follow his example. The same simple formula has proved successful in most of the country's major cities although no one has yet managed to repeat the spectacular results of the shows in London. But they have given the organizers enough encouragement to hold them again.

There are always fears that the Sinclair bubble might burst but it has shown no signs of doing this yet. And America is a new land of opportunity for anyone wishing to do the same sort of thing. ☺/☺



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Fun In The Carrotpatch

Description: In the game called **Packrabit**, you are a rabbit being chased by four hunters. You must eat all the carrots in a large, complicated maze before you are captured by the hunters. You score one point for each carrot you eat.

Scattered around the maze are magical carrots. When the rabbit eats a magical carrot, the hunters change into a form in which they can be eaten. The rabbit scores ten points for each hunter digested.

There are two holes on each side of the screen. When the rabbit goes into one of these holes, it comes out on the other side of the screen. This is an aid to escape from the four hunters.

The player is given



Welcome to TSU's regular software roundup, in which we test and review program products currently on the market. We hope our reviews will help you spend your computer dollars wisely.

Each month TSU's reviewer, will look at a number of programs with some common theme. This month, it's action games: whether the programs on these pages feature hunters chasing rabbits (as in Packrabit) or aliens firing laser guns at humans (as in Space Raid), they all test your reflexes to varying degrees.

Each program is first described and then evaluated: How well has it achieved its goals? How clear are the instructions? And — most important — how much fun is it to play?

Our rating system is a simple scale of 1 to 10, with 10 being top marks. Let us know if you agree with our ratings!

ten lives and a choice of two games, one having more complicated mazes than the other. Each game has three mazes. After eating all the carrots of one maze, the player is immediately placed in another maze.

The game can be played at ten speeds. The novice will like the lower speeds. The rabbit has little hope against the marauding hunters.

Evaluation: We found Packrabit to be as fast and exciting as the famous arcade maze games. Racing through the mazes is very addictive indeed. The major difference between Packrabit and other maze games is the greater size and complexity of its mazes. As it is important to conserve the magical carrots until they are most needed, players must carefully

plan their routes in advance.

The choice of games and levels of speed allow the player to choose the game most suitable. Having a total of six mazes should maintain the interest of highly skilled players. Packrabit was designed so that the final mazes are the most difficult.

Packrabit requires a 16K memory and is distributed by International Publishing and Software. It is probably the most enjoyable and challenging game we have found for the T/S1000, ZX81. For this reason, we have chosen to give this game away, free, to all subscribers to this magazine. We hope you enjoy it as much as we have. (Circle 1 on Reader Inquiry Card.)

TSU Rating: 8.

Flying Your T/S1000

Description: In **Night Gunner**, you are the pilot of an airplane in combat with four enemy planes. At the center of the screen is your firing sight, a cross used for aiming. Using the cursor keys, you maneuver your airplane to get the enemy aircraft within your sights, and then you fire. The object is to destroy the enemy airplanes before they destroy you.

Evaluation: This game is fun. Each time I played, I was shot down without warning after destroying several enemy aircraft. Pointing the sights at the airplane was difficult, and when I did, I was usually too slow in shooting.

Night Gunner is programmed in machine language for fast action. The graphics used for planes aren't great, but recognizable.

Distributed by Softsync, Night Gunner is a refreshing change from the standard shooting games. However, given the choice, I'd rather play one of the more conventional shooting games. Night Gunner requires a 16K memory. (Circle 2 on Reader Inquiry Card.)

TSU Rating: 7.

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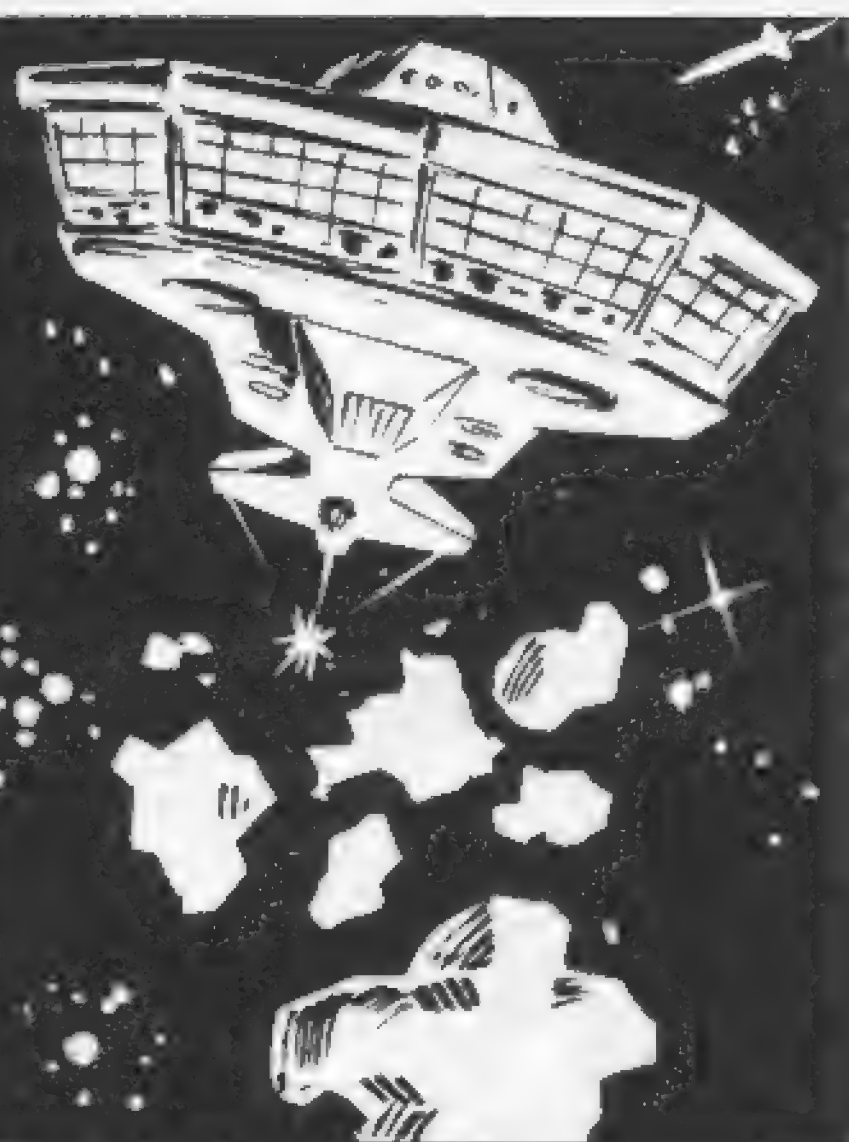
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Points Lost for Program Flaw

Description: By skillfully piloting your ship through space and firing at enemy craft, you must protect your convoy from destruction in **Cosmos**. You must direct your ship near an alien and fire your laser before it gets away. Points are scored by destroying alien ships.

The player is presented with a black screen. The player's ship is a flashing square in the center of the screen. The direction keys scroll the screen in any direction allowing for quick movement through space.

While flying, you must avoid hitting your own convoy and alien space mines. An alien space mine destroys your ship. A player gets three lives for the game.

Cosmos features **Mindware's** "Quickload" program which they say loads the program four

times as fast, it was probably closer to three.

Evaluation: The graphics and speed of **Cosmos** make it a very good game. The full black screen using periods for stars make a very effective visual. The game is enjoyable and challenging to play.

I found a major bug in the game when I ran into an alien space mine. The screen flashed, signifying I was hit, but the game never resumed.

Without the bug, I would rate the game a nine. The graphics of this game are better than most. Due to the one major flaw, I cannot rate **Cosmos** favorably. It is distributed by **Mindware**, and works in 16K. (Circle 3 on Reader Inquiry Card.)

TSU Rating: 4.

Aliens Attack Again

Description: In **Invasion Force**, you control a laser base and must shoot through a moving force field and destroy an alien ship. If you hit a black blob in the moving force field, all your damage to the ship is repaired. Smaller ships fly by and drop bombs on you. The game ends

when you run out of laser bases or you run out of time.

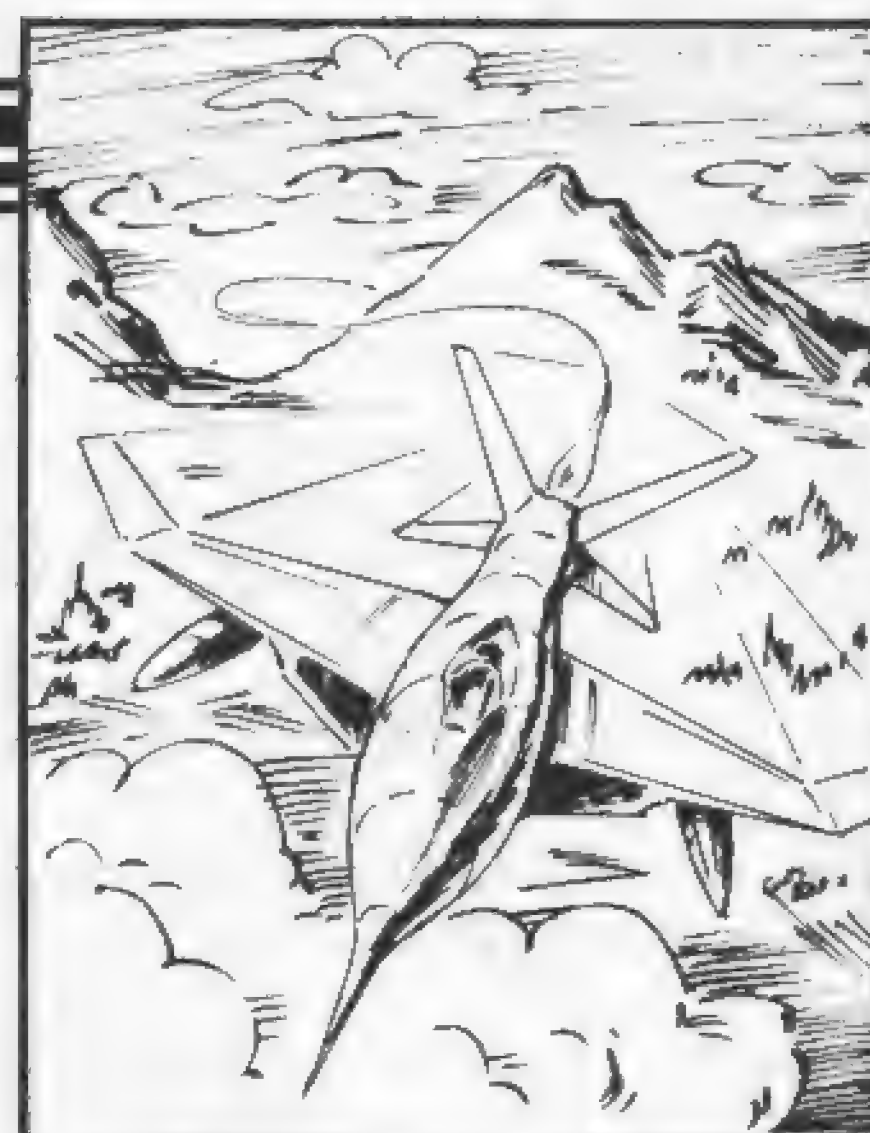
Evaluation: This is a fun game to play. The enemy ship is difficult to destroy and the moving force field is an interesting obstacle to shoot through.

The graphics of the game are unusual. The instructions scroll off from left to right after you read them. When the laser base or the alien ship is destroyed, the explosion is shown graphically.

A timer goes from 15,000 to 0. After destroying the ship, the player scores the amount left on the timer. In my best game, I destroyed the ship three times and scored 25,390 points. Can you beat that? **Invasion Force** requires a 16K memory and is distributed by **Reston Publishing**. (Circle 4 on Reader Inquiry Card.) TSU Rating: 9.

Happy Simulated Landings

Description: With the **Flight Simulation** program you must land your airplane successfully on the runway without crashing. Sitting in the cockpit, your control panel shows your speed, altitude, fuel and power. The top of the screen is your



viewing window for the landing.

The player is given the option of flying just the final approach. Another option is wind effects. If the player chooses to have wind effect, a wind speed is given which makes landing even more difficult.

Evaluation: **Flight Simulation** is an interesting use of the T/S1000, ZX81. This is not a standard game where the player receives a score and has three lives to play. This involves no shooting at enemy aircraft. The player wins by not crashing.

In playing this game, I learned that I should never try flying a real airplane. I crashed every time. Each time I crashed, a message was printed, such as: "You crashed into the ground at a speed of 187 knots."

Flight Simulation is definitely recommended to all amateur pilots. It requires a 16K memory and is distributed by **Psion Ltd.** (Circle 5 on Reader Inquiry Card.)

TSU Rating: 10. @/ @

Link to the real world

DOWN East Computers of Greenville, N.C., has produced an all-purpose voltage and temperature measuring system designed to interface with the T/S1000, ZX81 computer or any Z80 based system. The Votem, as it is called, containing all the necessary hardware and software, is an ideal link between the digital and the real world (analog). It is sold both assembled and in kit form.

For the kit, Down East appears to have spent a considerable effort on component selection to insure a good PC board layout and ease of user connections. The board layout is easy to understand and more important, it allows for easy servicing (should it be needed).

All the parts are labelled directly on the board and correspond neatly with the schematic diagram supplied. The connections are quite accessible for easy assembly. They too are well labelled, which helped us avoid any "fatal" mistakes. To make it even simpler and faster, no soldering connections are made to the board. They are

all made via jacks or terminal screws.

The manual is extremely comprehensive and written to be understood. It starts at basic principles and guides the user, step-by-easy-step, through the assembly, operation, calibration and features of the Votem.

Nothing is left to guesswork and the manual tries (successfully, we feel) to insure that the user will not make errors due to any poor explanations. The circuit explanation and the schematic diagram allow you to gain an understanding of the principles of analog interfacing.

The Votem is not geared toward a programmer's use but rather toward the experimenter's enjoyment. Several applications are described in the manual such as a game paddle or a light

detector. Many other uses come quickly to mind; photography (temperature and timing), home energy savings (temperature control), light industry (voltage sensing).

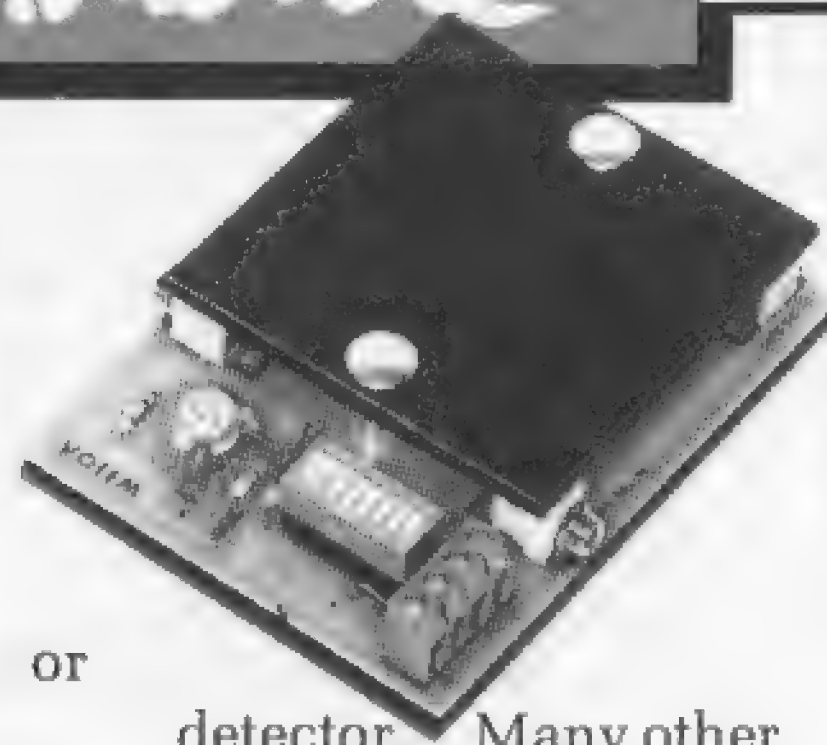
Finally, the cassette interface incorporated on the Votem board allows great scope on tone and volume settings. The "audio out" together with the LED indicator let me know that something was actually happening. A Schmitt trigger in this circuit amplifies the loading signal and reduces noise. This allows you to load a program at a lower volume.

The Votem opens up a whole new world (the real world) of applications for the TS1000, ZX81 user. For further information circle number 6 on Reader Service Card.

OUR EVALUATION

TSU rates the Votem in the seven categories listed below. The highest rating is 10, and means excellent; the lowest is 1, and means poor.

Mechanical Construction	8
Ease of operation	9
Reliability	8
Servicing needs	8
Manual	10
Usefulness	7
Appearance	5



Now your computer talks back

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sound to your programs. It can "say" all the letters of the alphabet, the numbers 0 to over one million, and some standard words. You can make it say new words by plugging additional "wordpack" ROMs into your speech pack. The unit comes complete with a built in amplifier, speaker and volume control. The applications of this unit could be tremendous in preparing material for education, program instructions, and in making games more fun to play. At the rear of the unit is an edge connector to allow other add-ons to be used with it.

For more information, circle reader service number 7.

Word processing potential

THIS handsomely designed unit, put out by Memotech, allows the user to connect the T/S1000, ZX81 to a "normal" parallel printer. It contains all the software for code conversion to printers such as Epson, Centronics, SCM, and others. All Timex Sinclair printer com-

mands such as COPY, LPRINT, LLIST are supported. All control codes for the printer may be utilized by the interface, and these may be used for document formatting. The computer's normal characters are printed as upper case letters and the inverse characters (graphic) are printed as lower case letters. The graphic symbols may not be printed, but can instead be used as control codes. Now with a



good software package the T/S1000, ZX81 can be made to do some small word processing

applications.

For more information circle reader service number 8.

Back-up system for data



THIS unit, called the ZX-99 RS 232C & Tape Control System is designed for the person needing large data-base capabilities. It provides control for four tape recorders (they must have a "remote" plug). It will allow you to save up to 200K bytes on one

C-90 cassette tape. Further, it gives you a visual indication of the status of each tape. The system's built-in software program contains many file-handling routines, such as, "Block Skip", "Merge", and "Search". The unit comes equipped with a serial output which follows the standard RS 232C format. Each of the RS 232C functions are controlled by you and you may select any one of eight BAUD rates. Also, you may use any parity and stop-bit configuration.

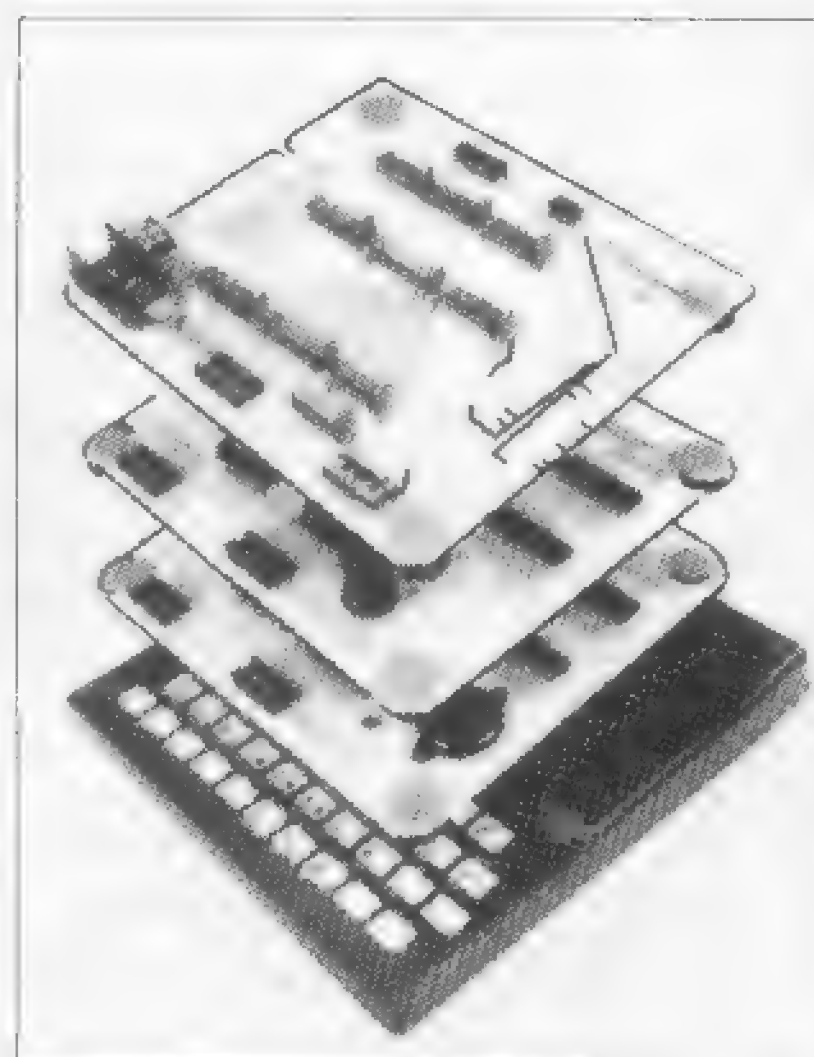
NOTE: This is only an output and cannot be used with a modem.

For more information, circle reader service number 9.

Input/Output Board lets you add on peripherals

THIS I/O (input/output) board is a must for any hardware oriented T/S1000, ZX81 owner. It lets you add on such peripherals as digital to analog and analog to digital converters. All address and data lines are buffered in order to provide extended drive capabilities. All address lines are decoded for ease of operation and all internal and external memory is inhibited when you select I/O. A rear edge connector allows you to use other add-ons such as a printer or a RAM pack at the same time.

You can add other Microdevelopment



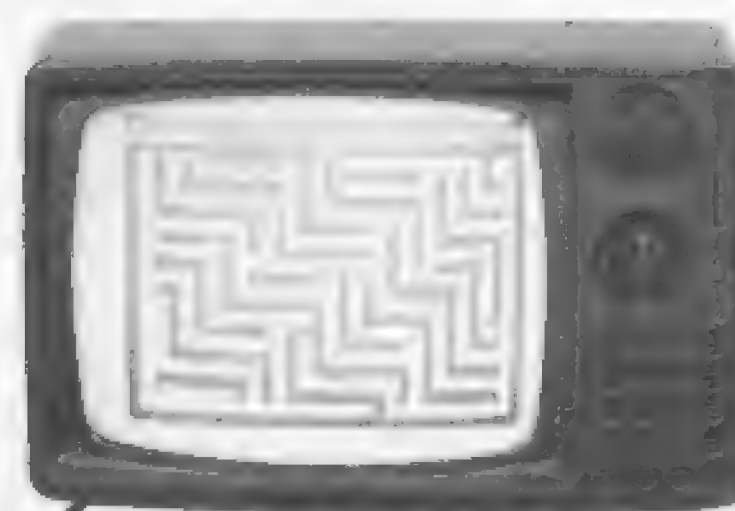
peripherals to this board (a "Beeper-Clock" Module or a D/A — A/O converter) or you may custom build your own add-ons.

For more information, circle reader service number 10. ☺/☺

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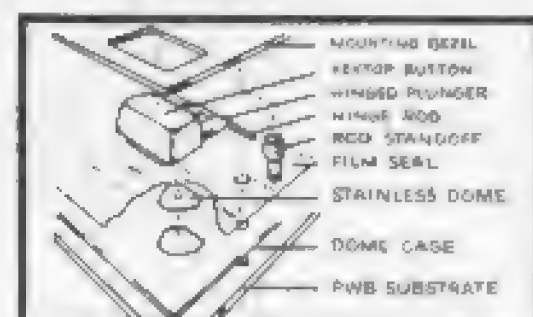
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In our premier issue, Timex Sinclair User features an exclusive interview with Dan Ross, the man who heads up the Timex computer division. His decisions will hopefully make T/S computing ever more fascinating in the future.

Managing Editor Joe Gladstone reports.

Meet the man who clogged up Connecticut's phone system

PROBABLY the man most difficult to reach in the computer business is Dan Ross, Chief Operating Officer of Timex Computer Corporation. Sinclair Research in the U.K. brought out the hardware and Timex added the marketing skills. Together they produced the Timex Sinclair 1000 computer. It entered the marketplace last summer and by the end of 1982 was a major force, according to industrial sources. Timex sold more than 600,000 units, which translates into more than 30 per cent of the market. This tremendous penetration into the market place means Dan is trying to be everywhere at once.

In its first year of operation under Dan Ross, Timex Computers built a base of over 15,000 retail outlets for their products. This figure is as of the end of 1982.

"We're expanding our base and we're also entering new markets that we didn't specifically go after last year" Dan says. "In addition, we're moving off geographically into some new markets. We're planning a launch in Europe in 1983."

Many of those 600,000 new computer owners have expressed frustration in trying to get through to Timex to ask about the problems they have encountered with their machines. Many of those 600,000

... the T/S1000 is now
part of the
Smithsonian's
permanent collection

new computer owners were first-time computer buyers and expected some back up from Timex. How did Timex respond to their legitimate needs?



Ross: bringing new products.

"Well, it's certainly something we're trying to address," Ross said. "We try to be responsive to any correspondence; we opened the 1-800-24 TIMEX telephone number to allow people to call in, and we've staffed it. I know initially last year when we started that number, there was such a deluge of calls coming in, it virtually clogged up the entire Connecticut phone system. I don't think any organization, including the Bell Telephone Company, could handle that type of volume, but we have increased our staff."

The mass of new owners created an "instant market" for software to put into the computer. There was a great deal of good material available from the U.K. where the original computer, the ZX81, had been on the market for over a year.

But what about in the U.S.? How were American companies fitted in to fill an American need?

Dan Ross on available software: "We have at this time over 70 titles that are available with our label on it, and of course there are literally hundreds of other titles that a user can buy. The other sources that we get software from are houses that we contract to develop specific software for us as well as our own internally developed software."

The questions that is on the lips of the nation are, 'When will the

T/S2000 be on sale in North America?" And secondly "Why is it so different from the Spectrum in the U.K. that the Spectrum software is incompatible?"

Dan Ross on the T/S2000 line: "It will be out about mid-year. The 16K version will sell for \$144.95, the 48K for \$199.95.

"We have headed the design objective to make the product as compatible as possible to the Spectrum, but we wanted to add features to it that we felt were essential to our market. Specifically, we enhanced the product to accept solid-base software."

Beyond software, Dan specifically talked about users' groups. He felt they were a major way in which novice or expert computer users could get much more from their machine.

"Quite frankly, they're quite a resource for us.

"We're setting up user groups. These have come on-stream slower than we had hoped, but we're setting up user groups throughout the country.

"I've spoken at a number of meetings myself personally to reflect our support of what they're doing. We don't want to control these, but we certainly want to be involved."

Ross seemed also exceptionally interested in establishing the T/S1000 as a valuable tool in the education market. He felt the Timex Sinclair computer was especially suited to schools. It is light, inexpensive, easy to use, and a good tool to use to introduce programming to children.

Dan Ross on education: "We're really excited about this market because it relates to our products. Computers in the classroom, computer literacy is something we're certainly committed to. Our product is very well suited for use in education.

"We recently launched a program in the state of Connecticut. This program is unique in that it is a curriculum-first, teacher training, as well as the classroom training

for the student. It's software, courseware, literature, as well as the hardware. Our product is targeted more to computer literacy than, say, the computerized system of instruction. But this is a program that we have developed in conjunction with some of the leading educators in the country. Specifically, we've been working with some of the educators of Villanova University.

"I think it'll certainly aid in our objective of providing computer literacy to the masses."

The next question was about the

"Certainly we endorse . . .
magazines about our
product."

new machine everyone is buzzing about, the T/S1500.

"We haven't announced any product like that," Dan said.

Well, that may be Dan, but in our news report we do have some "unofficial" information about that "non" machine.

Dan allowed that Timex and Sinclair were still actively working together to bring new products to the U.S. When asked about the much-publicized Sinclair flat screen monitor, he replied, "I'd prefer to let him (Clive Sinclair) speak to you on that particular device." Then what products can we expect soon?

Dan Ross on the new products: "The printer was launched a couple of weeks ago at major department stores. We're developing a MODEM for the 1000 and the 2000. In addition, we're moving off geographically into some new markets. We're planning to launch a program in Europe in 1983 in conjunction with Sinclair."

This magazine is a new product. While not connected to Timex Computers, we certainly are heavily involved with them and their related products. Have you any kind words to say about us?

"Certainly we endorse having people put together magazines about our product. I think it offers

our users a range of documents that they can go to to get information, to find out about new products, to find out and continue to build that interest that you alluded to in our products."

Dan seems to be very sincere when he expresses concern that those people who want an inexpensive computer to join the computer age deserve the best available.

Dan Ross on personal computers: "We are committed to making sure that we are the price-value leaders in our particular segment. I think that we're going to continue to try to bring the best price-performance, price-value computers to the market place."

Dan Ross on Dan Ross: "I'm from Atlanta. I went to school in Louisiana. My background is math and computer science from Louisiana Tech.

"I've been in data processing now for 17 years, at IBM mainly in the mainframe area. My career has spanned IBM, Intel Corp., and Memorex. I was brought on board (hired by Timex) actually about a year ago to start the Timex Computer Corporation. It's been a wild ride since."

Starting with the T/S1000, Dan Ross with Timex made history. It was the first computer in the United States to retail for under \$100.00. To honor this fact, the Smithsonian Institute has selected the T/S1000 for its permanent collection. Dan Ross made the formal presentation in Washington, D.C.

On March 15, an ad in the Wall Street Journal showed the T/S1000 for sale for \$49.95. From under \$100.00 to under \$50.00 in 7 months . . . not bad, Dan Ross, not bad, but what's left to do?

"I think we've just scratched the surface. I think it's vastly important that people become involved with computers. Our product is especially suited to provide them their first step into computers, to learn about what computers are all about, and I think the market will continue to explode as it did in 1982 for the rest of this decade."

2/8



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CARTRIDGES

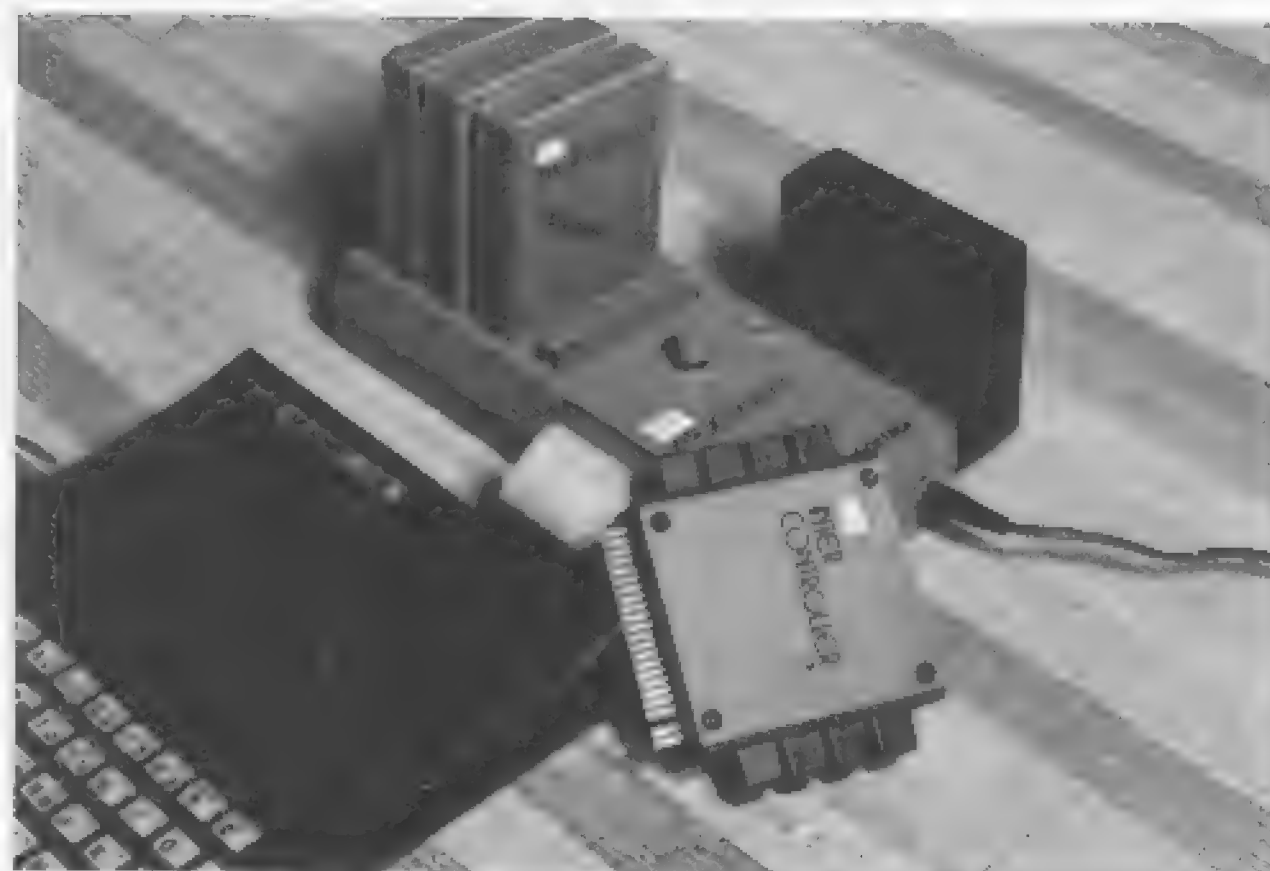
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Many intercomputer programs are also available on solid state cartridges. Just plug a cartridge directly into your TS 1000 or if you have a SOFTBOX™, connect up to four cartridges to your computer at a time and enjoy having instant and easy access to your favorite program.

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Many thousands of satisfied customers now have a highly reliable loading system which operates 16 times faster than the Sinclair system. This is what you get:

1. A cassette interface to improve the signal quality (essential if a high speed loader is to be reliable) which will also improve the loading of your programs. The interface plugs into your Timex Sinclair 1000 using the leads supplied and has been improved to incorporate: AN AUTO-MATIC LEVEL CONTROL . . . AN OVERLOAD WARNING LIGHT . . . A SAVE/LOAD SWITCH (no unplugging of mic or earphone leads) . . . AN ON/OFF SWITCH (which doubles as a Reset switch). With these features loading is highly reliable (programs will still load with a volume setting as LOW as 1/4).
2. Highly sophisticated software which will load and Save programs at 16 times their normal speed (i.e. 8K in 10 secs; 48K in 110 secs). Programs can be named to allow a superfast file search through a tape. It works equally well with autorun programs, Basic or machine code. A TRUE verify feature is also provided — this allows you to verify that a 'SAVE'd program has 'SAVE'd properly BEFORE turning off the power and finding all is lost.

QSAVE will operate with ANY memory, on ANY program length AND with your existing programs.

All the above is contained in 1/2K of superbly easy to use Software.

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Now there is no need to spend long tedious hours writing and debugging your programs in laborious machine code — let MCoder do all the hard work for you . . .

MCoder is the first real integer compiler for the Timex Sinclair 1000. This very sophisticated piece of software will simply translate basic programs into machine code for you, giving an average speed improvement of the order of 75 times although in certain cases the improvement can be as much as 900 times faster. MCODER IS DESIGNED TO BE AS SIMPLE AS POSSIBLE TO USE . . .

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No doubt you have felt the frustration of not being able to see the listing or to make backup copies of machine code programs. Intercomputer STOPPER ends this frustration and enables you to break through any machine code software you want, list the program on the screen, save it on another tape, or print it if you have a printer. Simply load STOPPER and your program into your TS 1000 and follow instructions. Once loaded STOPPER stays in your computer and you may use it for other programs.

#PT4002 \$18.95

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A complete implementation of the FORTH language for the ZX81 and TS1000 computer. FORTH's most distinctive feature is its flexibility. The basic unit is the word — the programmer uses existing words to define his own which can then be used in further definitions. FORTH is a compiled language so programs run very fast (typically five times faster than BASIC).

ZX FORTH is supplied on cassette and is accompanied by extensive documentation.

56-page Users Manual
8-page Editor Manual

Z43 \$29.95

ZX BUG

Machine Code Monitor and Disassembler

ZXBUG is a powerful tool for machine language programming. It is 4K long and uses memory from 71EO to the top memory. ZX BUG works in hexadecimal (base 16), not decimal, so all addresses are a maximum of 4 Hex bits long. Provides a total of 28 commands.

Z41 \$14.95

ZX Assembler

This Machine Code program occupies 7K of memory and locates itself at the top of memory. The program is a full Editor/Assembler and Monitor. Labels may be used instead of any string. The features include Line Insertion/Delete, Insert Characters, Auto Repeat on all keys. The monitor has facilities to inspect memory, registers and run machine code programs.

Z40 \$14.95

TOOLKIT 9 Powerful New Functions!

RENUMBER. This routine renumbers a program in any step and from any line up to 9999.

DELETE. This command deletes a group of lines in a program.

MEMORY. Prints how much spare memory is available.

DUMP. Displays current values of string and numerical values, except arrays.

FIND. Will find any string of up to 255 characters and list each line containing that string.

REPLACE. Replaces any string of up to 255 characters by any other string.

SAVE. Transfers program in computer to below RAM TOP.

APPEND. Allows two programs to be joined.

REMKILL. Removes all REM statements from a program, otherwise leaving it unchanged, preserving memory.

Z42 \$14.95

Z-AID 1.0

Includes the following routines:

VERIFY confirms whether a program has been recorded properly on tape. The program in memory is unaffected, and a further "save" can be made if necessary.

Load-Msave enables a specified block of memory to be saved. VPTR can be used within a BASIC program to eliminate many tedious POKES and PEEKs in finding the addresses where variable values are stored.

CHAIN allows the second part of a BASIC program to be loaded and tacked onto the end of the first part.

Z AID 1.0 is convenient to use, being loaded from tape, and residing at the top of 16K memory. The user accesses the various routines with USR calls while loading, running, editing and saving BASIC programs normally.

Z98 \$14.95



Z61 \$19.95

- ★ Allows you to LOAD and SAVE ZX81 programs up to 6 TIMES FASTER!
- ★ Easy-to-use in your own programs.
- ★ User-transparent when incorporated into programs.
- ★ Verifies proper loading.
- ★ Catalogue feature lists program names and memory usage.
- ★ LOADER occupies less than 500 bytes (½ K) of RAM.
- ★ Consists of 2 separate programs — KEYBOARD MONITOR and FAST LOADER.
- ★ Supplied on cassette with extensive documentation.

KEYBOARD MONITOR is a user-friendly BASIC program which gives such information as the speed at which the tape was recorded, file name, file type, number of bytes in file, and whether a read error occurred. If desired, the user-friendly portion of the program can be removed for direct access to Machine Code Monitor. Both parts reside at RAMTOP and are user transparent. Full details are given in the manual for fast saving of your program.

FAST LOADER also resides above RAMTOP and can be used in front of any fast-saved program to enable it to be fast-loaded. This removes the need to load the monitor for each load.

Reliability and compatibility: Fast-Load is an exceptionally reliable system. In one 3 hour test, over 1,300,000 bytes of data were recorded and then read without error, using a low cost cassette player. Compatible with all ZX81 systems, at your choice of two operating speeds: Medium Speed (4 times faster) suitable for use with any tape recorder that works with ZX81; Fast speed (6 times faster) for most higher quality tape recorders.

The Complete ZX81 and TS1000 Library!

BOOKS

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A professional keyboard makes program entry easier and less error-prone.

Keyboard

K70 \$79.95

Metal case for keyboard and ZX81

E70 \$25.00

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Equivalent in performance to Times Sinclair RAM.
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Expands the capacity of the TS 1000 or ZX81 to its maximum. User transparent.
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NOTE

The case can be purchased separately with the keyboard aperture uncut, so if you have one of our early uncased keyboards, or in fact any other suppliers' keyboards, these could be fitted. The keyboard is connected to your computer by a ribbon cable and this has connectors fitted which simply push into the Sinclair connectors. It is a simple two minute job and requires no electronic skills. This keyboard does not need any soldering. Please specify on order whether you require the ZX 81 or Spectrum case.

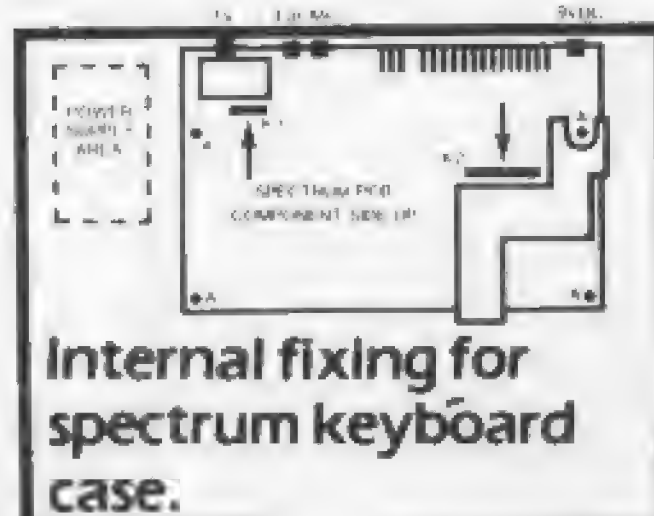
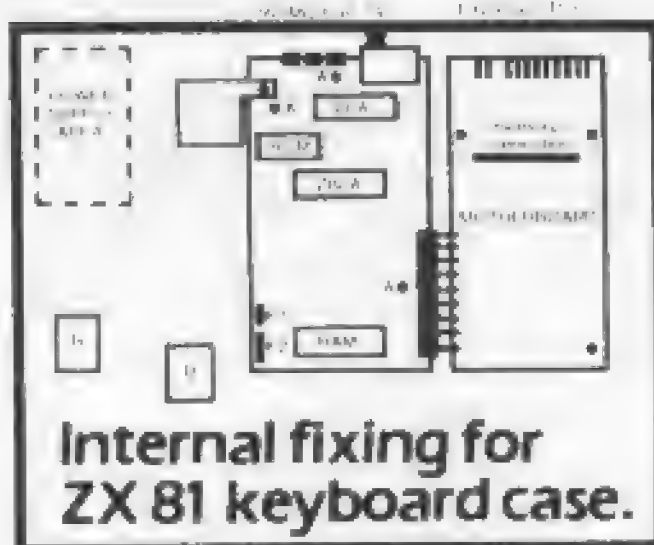
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This is supplied with spectrum legends, and a slightly different base for fitting the spectrum inside. again all the connectors are at the rear of the case and there is plenty of room for the power supply (and other add-ons). Should you want to change, we can supply both the Spectrum legends and details of updating your case which will enable modification from the ZX 81 to spectrum. PLEASE specify on your order whether you require the ZX 81 or spectrum case.

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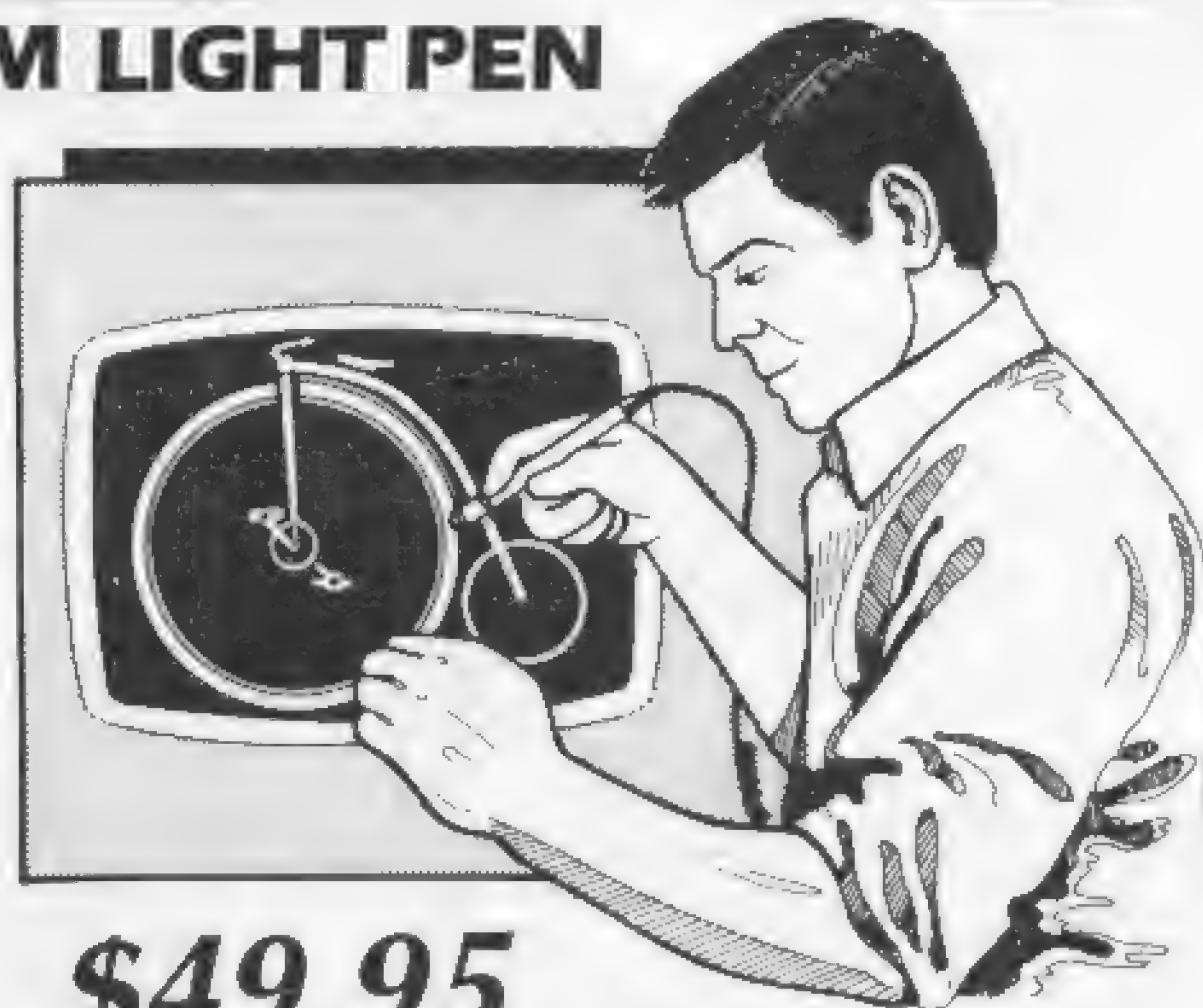


**KEYBOARD
(SPECTRUM/81)**



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64K Memory Expansion
All the above information advantage lies in the 56K of usable memory. The use of other 2 8192-65536. The Spectrum Memory Upgrade your Spectrum it is simply slipped in and are supplied, and time. The fitting is the same as Sinclair's.

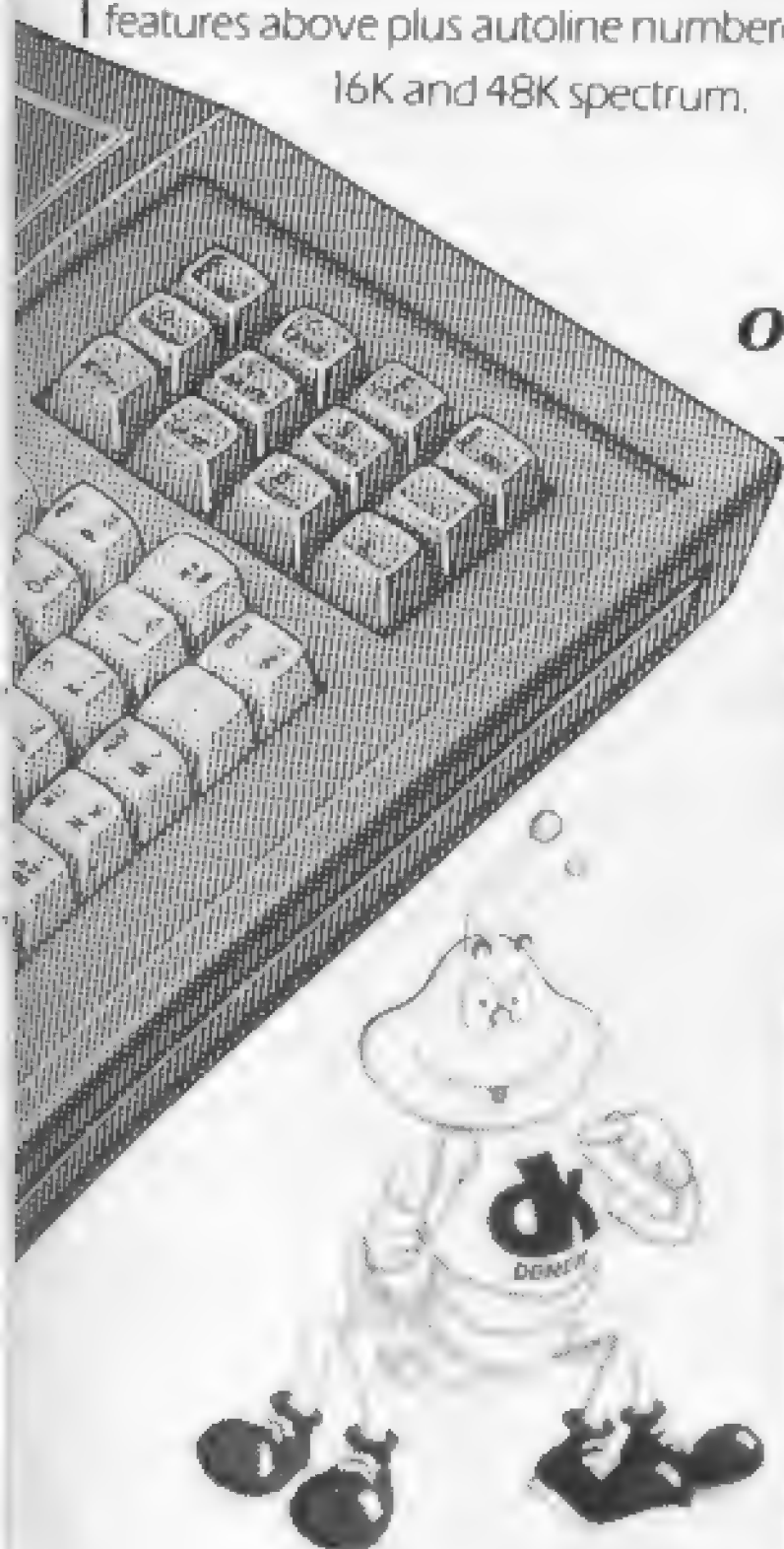
ZX 80~81 Spectrum HARDWARE

SPECTRUM/81 TOOLKIT

This is the toolkit which won acclaim in the feature in the August 1982 issue (pages 29 and 30) of Sinclair User. "It is the most impressive program, fast in execution with clear and full instructions...it stands out from the rest of the field." The ZXED is a powerful editor for use on the expanded ZX81. It is intended for use by the serious BASIC programmer and offers several useful and time saving features most helpful during all stages of program development. The facilities provided are as follows: ALTER, BYTES, COPY, DELETE, FIND, HELP, INSERT, KEEP, MOVE, RENUMBER AND VERIFY. The Spectrum Toolkit contains most of the features above plus autoline numberer and append, and will run in the

16K and 48K spectrum.

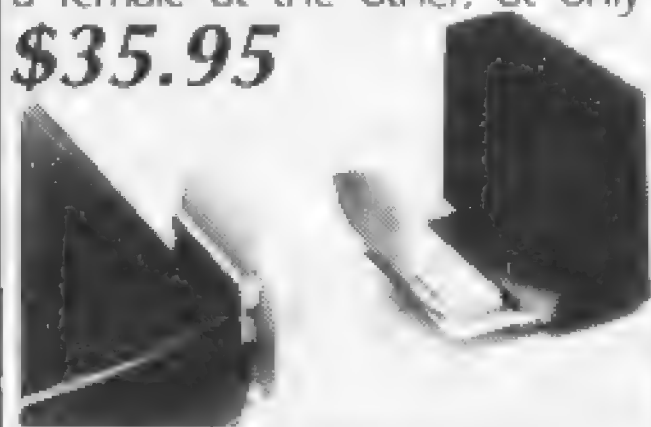
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The DK Graphic module is our latest ZX 81 accessory. This module unlike most other accessories fits neatly inside your computer under the keyboard. The module comes ready built, fully tested and complete with a 4K graphic ROM. This will give you an unbelievable 448 extra pre-programmed graphics, your normal graphic set contains only 64. This means that you now have 512 graphics and with their inverse 1024. This now turns the 81 into a very powerful computer with a graphic set rarely found on larger more expensive machines. In the ROM are lower case letters, bombs, bullets, rockets, tanks, a complete set of invaders graphics and that only accounts for about 50 of them, there are still about 400 left (that may give you an idea as to the scope of the new ROM). However, the module does not finish there, it also has a spare holder on the board which will accept a further 4K of ROM/RAM. This holder can be fitted with a 1K/2K/RAM and can be used for user definable graphics so you can create your own custom character sets.

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16K (uncased) \$35.95
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64K (uncased) \$132.00

The above illustration shows the casing for the 16K or massive 64K

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Dynamic Ram Chips. We use the dynamic as they are much denser than static, they take up less space. They are also much cheaper than the equivalent product. The Ram is manufactured with high quality materials, and uses high quality components. It is supplied ready-built and only needs to be plugged into the rear of the computer. The components are fitted into holders. This massive add-on memory module is fully assembled and tested, it is the cheapest 16K memory available anywhere from 16384 to 32768. (Same as the Sinclair memory.)

16K (UNCASED) \$35.95

Expansion \$135.00

Information on the 16K also applies to the 64K Memory Expansion, but the 64K giving nearly FOUR times the memory. This advanced model has more memory. In addition, the block from 8K to 16K can be switched out to enable 32K add-ons. The graphics ROM is to be used in this area. Position in Memory: Block From 8192-16384 is switchable.

64K (UNCASED) \$132.00

Memory Expansion \$54.00

Expansion from 16K to 48K of user Ram. The Spectrum memory expansion is simple to fit, inside the case, and then only requires plugging in. Full fitting instructions are included. The only tool you will need is a screwdriver and just two minutes of your time requires no electronic skills. Position in memory from 32768 to 65536. (The upgrade to 48K).

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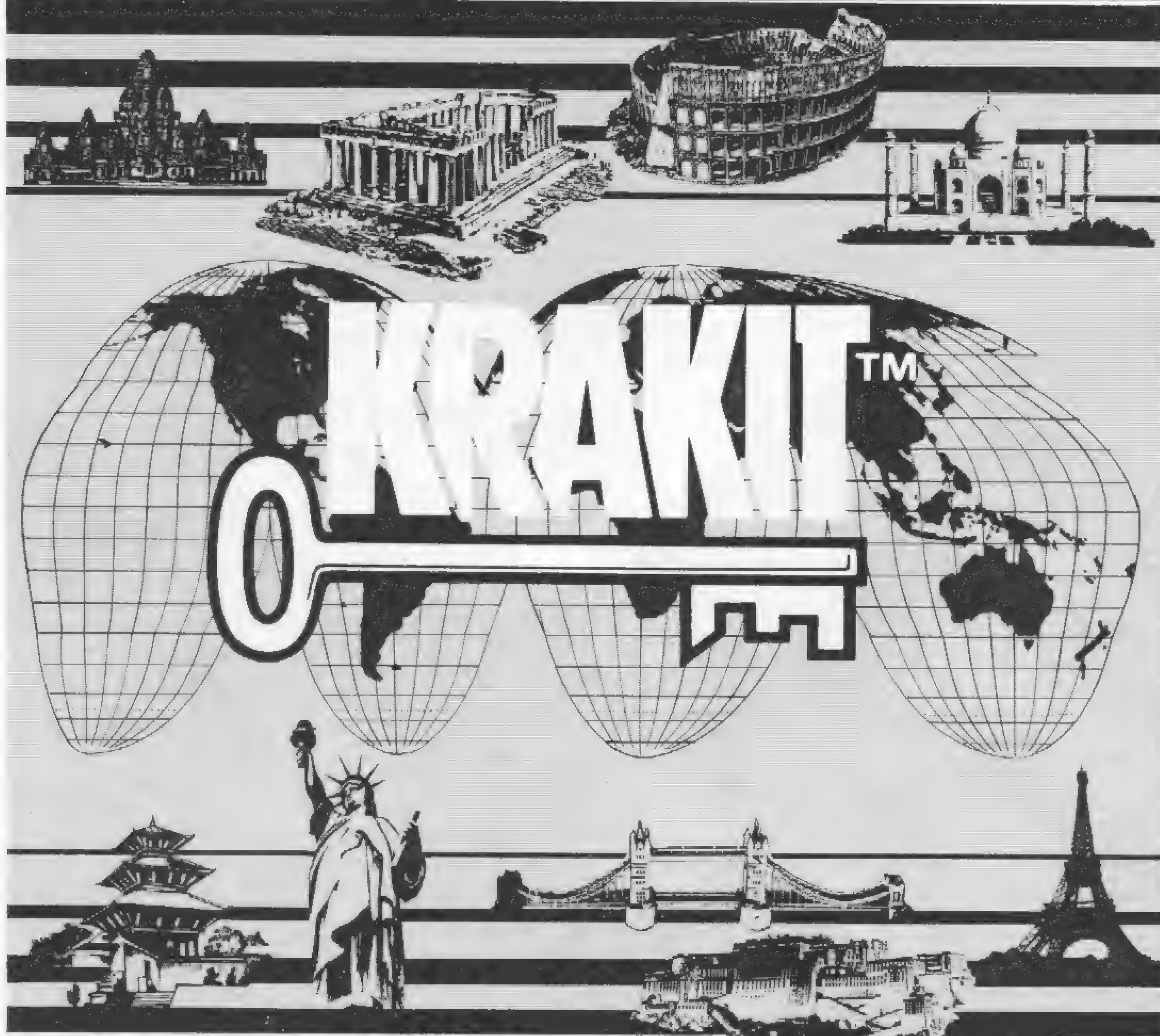
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TS1000-ZX81



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How I started a user group

Forming one is easy when you follow
Sue Mahoney's
tried-and-true method

A LOT OF PEOPLE have asked me, "What is a user group and how does one get started?" A user group is a group of people who meet on a regular basis to share and discuss ideas and problems regarding the computer. There are many different types of user groups. Some are formed by owners and users of a brand of computer, such as Timex Sinclair, while others are formed around a particular type of application or language such as Telecommunications, Robotics, Business or PASCAL (to name a few). These groups generally meet once a month, welcome new members, and are free of charge, at least on an introductory basis.

The meetings vary in structure from formal to informal; however, most groups allow time for both formal presentation and informal discussions. The whole idea is to have an opportunity to meet and share ideas, breakthroughs in particular problems, and information on hardware or software.

Most user groups charge a nominal fee (between \$10 and \$20 per year) for membership. This helps defray the expense of printing and mailing newsletters, and other operational costs. Most user groups are non-profit organizations run by volunteers. Some advantages of the non-profit status: donations of products, materials or space are tax deductible for the donor; bulk mailing costs considerably less; and most newspapers will publish announcements about meetings at no charge, provided you meet their lead times.

Now that I've described what a

user group does, I'd like to explain how I started one. In September 1981, I was just completing some contract work for the American headquarters of Sinclair Research Ltd. in Boston. I was very excited about helping plan the introduction of Sinclair's ZX81 into the United States. Even then, I believed that this computer would revolutionize the American public, because it would allow people who previously could not afford a computer an opportunity to buy one, learn how it works, and develop new applications for its use.

I was so anxious to meet people who were working with their Sinclair computers, I decided to form a user group. My first step was to approach Johnathan Rotenberg, founder and president of the Boston Computer Society. BCS is the largest and most prestigious personal computer society in the country, and boasts more than 20 different user groups and 7000 members throughout the world. Since BCS did not have a Sinclair user group, and I lived in Boston, Johnathan agreed I could start one under the umbrella of BCS, and I was off and running.

My next step was to set a date, time and place for a meeting, and publicize it. I really did not know how many people to expect at the first meeting set on a Wednesday evening in October 1981 and was pleasantly surprised to see 18 people attend. The agenda for this meeting was rather informal. I explained the purpose of the group and got people to share their ideas and experiences. I was very encouraged by the synergy that developed in the discussion.

We experienced growing pains. At subsequent meetings, we expanded at a 20 to 50 per cent rate per meeting, and out-grew our meeting room four times. Our audience grew from 18 to more than 100 people in four months; some meetings have been attended by almost 200.

Our actual membership as of February, 1983, is around 600 people, most of whom are from New England; however, we have had some individual members from other parts of the country who joined just to receive our newsletter, as well as other BCS benefits.

In addition, we have a policy whereby any other Timex Sinclair

Sue Mahoney (second right) with members of the Boston user group



User groups

user group mails us its newsletter and we send it our newsletter free. Consequently, in February, we mailed more than 700.

In July, 1982, because we wanted to support owners, users and potential owners of both the Sinclair and the Timex computers, we changed our group name to Sinclair Timex user group.

Regarding the regular monthly meetings, I believe that it is very important for the people attending to feel they are an integral part of the group, so I structure the meeting to provide ample opportunity for people to contribute and interact.

During the first one and a half hours, we usually have a few people scheduled to make a presentation on some aspect of the computer; for this we rely heavily on active group members. Many of our members have started their own companies (EZ Key, King Software, Siriusware) as a direct result of their participation in the group. Occasionally, we hear speakers from companies that provide owners and users of Timex or Sinclair computers with hardware, software, publications or services.

October 20, 1982, was our first anniversary. We were extremely fortunate to get both Dan Ross, Chief Operating Officer for Timex Computer Corporation and Margaret Bruzelius, Executive Vice President for U.S. Operations, Sinclair Research Ltd. to speak to our group. They gave us some background on their respective companies, described what they feel the future holds for owners and users of their respective products, and answered questions.

After our speakers, we generally have a short break so people can look at displays and talk. Then we reassemble, hear announcements from the group, and break into smaller interest groups. These include: a beginners' group (I always encourage prospective buyers to come and ask questions of actual owners); advanced groups in assembly language, FORTH, and other specialties; and groups struc-

tured around special interests, such as education and genealogy.

Sometimes our user group undertakes special activities. Last summer, we sponsored a two day kit-building session, during which anyone with a ZX81 kit received free assistance in constructing it. Three of our members circulated around the room, helping others, including some who had never touched a soldering iron before.

We plan to have a seminar on assembly language for the Timex Sinclair in the future.

Our newsletter, one of our ongo-



Sue Mahoney: starting up

ing activities, has expanded from a one page, hand-printed announcement of the next meeting, to an 8-page, typeset newsletter with articles about hardware, software, programs to try, as well as a recap of the last meeting and highlights of the next.

We have just formed a library committee. We have had some books, software and monthly publications donated, and are organizing this material so that it can be checked out and used by members.

I am also looking forward to the
Next month, we will publish a comprehensive list of user groups from across North America. If you would like your group to be included, please write to:

Timex Sinclair User
User Group List
49 LaSalle Ave.
Buffalo, New York
14214

future when we will have access to modems so that we can communicate with one another through various data banks. We probably will put our newsletter on one of the national data bases within several months.

In conclusion, there is some work involved in starting and running a user group. You must be willing to listen to others and be able to enlist their help and support, especially if you want the group to grow.

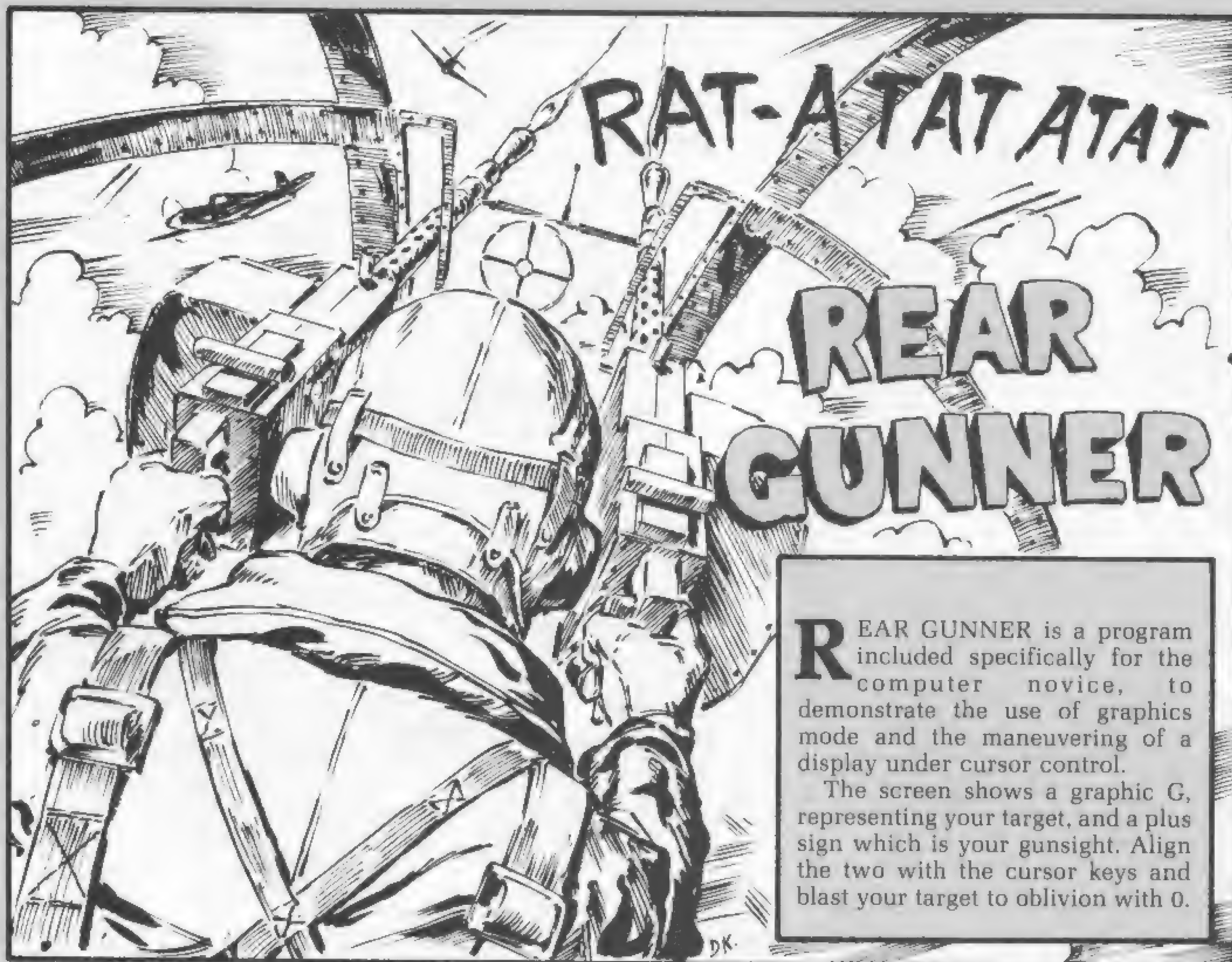
You must involve many people on many different levels, in such essential tasks as the planning and coordinating of meetings; writing, editing, and getting advertising for the newsletter; getting it printed and mailed; making signs for the meeting place; getting meetings publicized; and so on. Another key factor is to structure the meetings and activities to encourage new members: otherwise you may stagnate. Recruiting new members is very important in keeping the group alive.

Personally, I can say that this has been an extremely rewarding experience for me. By starting this group, I have met and talked with many interesting people who have been extremely enthusiastic about the Timex Sinclair computer. It has also opened doors for me professionally. In November, 1982, I became Technical Support Manager for Timex Computer Corporation in their Corporate Headquarters in Middlebury, Connecticut.

Our user group is composed of people from all walks of life and all ages, including engineers, educators, businessmen, students, and clergy, to name a few. Every third Wednesday, we meet with information to exchange and enthusiasm to share. ☐/☐

Susan C.T. Mahoney, founder and director of the Sinclair Timex User Group, Boston Computer Society, Boston, Massachusetts, is also Technical Support Manager for Timex Computer Corporation, Middlebury, Connecticut.

PROGRAM PRINTOUT



REAR GUNNER is a program included specifically for the computer novice, to demonstrate the use of graphics mode and the maneuvering of a display under cursor control.

The screen shows a graphic G, representing your target, and a plus sign which is your gunsight. Align the two with the cursor keys and blast your target to oblivion with O.

```

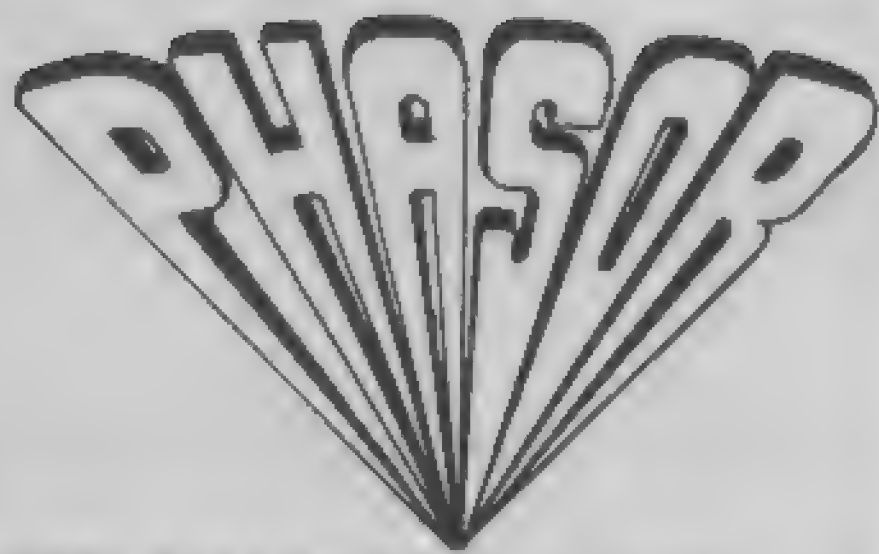
5 PAUSE 50
10 LET A=5
20 LET B=7
30 LET C=INT (RND*26)
40 LET D=INT (RND*17)
50 PRINT AT D,C:"(graphic G)"
60 PRINT AT A,B)" + "
70 PRINT AT A-1,B)"   "
80 PRINT AT A+1,B)"   "
90 IF INKEY$="5" THEN LET B=B-1
100 IF INKEY$="8" THEN LET B=B+1
110 IF INKEY$="7" THEN LET A=A-1

```

```

120 IF INKEY$="6" THEN LET A=A+1
130 IF INKEY$="0" THEN GOTO 150
140 GOTO 50
150 IF D<>A THEN GOTO 50
160 IF C=B THEN GOTO 170
170 PRINT AT D-1,C:"(graphic
Y)SPACE;(graphic T)"
180 PRINT AT D,C:"(SPACE;inverse
SPACE;SPACE)"
190 PRINT AT D+1,C:"(graphic
T)SPACE;(graphic Y)"
200 RUN

```

REMARKABLE graphics effects are the striking feature of **Phasor** for the 16K T/S1000,ZX81. You are an infamous space pirate travelling home through hyperspace after a hard day's murder and mayhem. Suddenly you find yourself wrenched back into real space/time by a squadron of Federation star-ships. You are hopelessly surrounded. Can you fight your last battle with style?

The view from your cockpit is of stars and galaxies in the blackness of space. Each attracting star-ship is an inverse 0 appearing at random positions around the screen. You are required to note in which column it appears, relate that to the letters at the bottom of the display and hit the appropriate key on the computer.

If you miss, or delay too long, your assailant will take up position at screen center and send out a series of devastating thermal bolts at your ship.

That is where the original graphics come in. The two energy beams from the Federation ship approach with a striking 3D effect. If they are on target, they rock your pirate ship by means of the FAST/SLOW loop in lines 1200 to 1240. Excellent!

You cannot fire at the ship when it is firing at you. You must destroy 15 ships to qualify for a new screen and the game speeds up as each screen is cleared. If you break into the program, remember to re-start it with "RUN2", since the program saves itself in line 1.

A series of honorary accolades is awarded for a high score. Anything above 1,050 gains the accolade of Starfalcon, Starhawk or Stareagle, depending on the level of difficulty selected. You will have to be good, though, since the author of the program, Marcus Harvey, has managed a personal best of only 550. Let us know you how make out!

```

1000 1 SAVE "B"
1001 2 CLS
1002 3 PRINT "PHASOR";AT 1,0; "
1003 4 PRINT "WHAT LEVEL OF DIFFIC
ULTY?"
1004 5 PRINT "(1,2,OR 3)"
1005 6 INPUT X
1006 7 IF X>3 OR X<0 THEN GOTO 6
1007 8 LET INP=(1/INT X)*25
1008 9 CLS
1009 10 LET S=0
1010 11 LET SH=5
1011 12 LET P=20
1012 13 LET I=0
1013 14 CLS
1014 15 IF X=1 THEN LET A$=" FALCON
1015 16 IF X=2 OR X=1 AND S=2100 TH
EN LET A$=" HAWK"
1016 17 IF X=3 OR X=2 AND S=2100 OR
X=1 AND S=2850 THEN LET A$=" EA
GLE"
1017 18 IF S=1050 OR S=2100 OR S=28
50 THEN GOSUB 7000
1018 19 FOR N=1 TO 21
1019 20 PRINT "
1020 21 NEXT N
1021 22 FOR H=1 TO 80
1022 23 LET R1=INT (RND*20)
1023 24 LET R2=INT (RND*20)
1024 25 PRINT AT R1,R2; "
1025 26 NEXT H
1026 27 FOR K=1 TO 10
1027 28 LET R3=INT (RND*20)
1028 29 LET R4=INT (RND*20)
1029 30 PRINT AT R3,R4; "
1030 31 NEXT K
1031 32 LET Q=0
1032 33 LET Z=0
1033 34 PRINT AT 21,Z;CHR$ Q
1034 35 LET Q=Q+1
1035 36 LET Z=Z+1
1036 37 IF Z=20 THEN GOTO 165
1037 38 GOTO 145
1038 39 PRINT AT 2,26;"SCORE:";AT 3
1039 40 PRINT AT 6,26;"S";AT 7,28;"
1040 41 AT 8,20;"I";AT 9,28;"E";AT 10
1041 42 AT 11,28;"D";AT 12,28;"S
1042 43 AT 13,20;"=";AT 12,30;"5"
1043 44 PRINT AT 14,28;"P";AT 15,28
1044 45 AT 16,28;"A";AT 17,28;"S";A
1045 46 AT 18,28;"O";AT 19,28;"R";AT 20,2
1046 47 AT 20,29;"=";AT 20,30;"20"
1047 48 REM *****
1048 49 IF I=100 AND INP<>1 THEN LE
1049 50 T=INP-1
1050 51 LET R5=INT (RND*20)
1051 52 LET R6=INT (RND*24)
1052 53 FOR C=1 TO INP
1053 54 LET R5=INT (RND*30)+1
1054 55 PRINT AT R5,R6;"
1055 56 IF I=100 THEN GOTO 11
1056 57 IF P=0 THEN GOSUB 500
1057 58 IF C=000 INKEY$-38=R5+1 AND
1058 59 THEN GOSUB 300
1059 60 IF INKEY$<>" " THEN GOSUB 50
1060 61 IF INKEY$=" " AND R5=1 THEN
1061 62 GOSUB 300
1062 63 NEXT C
1063 64 PRINT AT R5,R6;"
1064 65 GOTO 1010
1065 66 REM *****
1066 67 LET T=T-1
1067 68 LET S=S+10
1068 69 LET I=I+10
1069 70 PRINT AT 0,26;" ";AT 3
1070 71 PRINT AT 20,30;" ";AT 20,3
1071 72 FOR F=1 TO 5
1072 73 PRINT AT R5,R6;"
1073 74 PRINT AT R5,R6;"(G)"
1074 75 NEXT F
1075 76 PRINT AT R5,R6;"
1076 77 GOTO 200

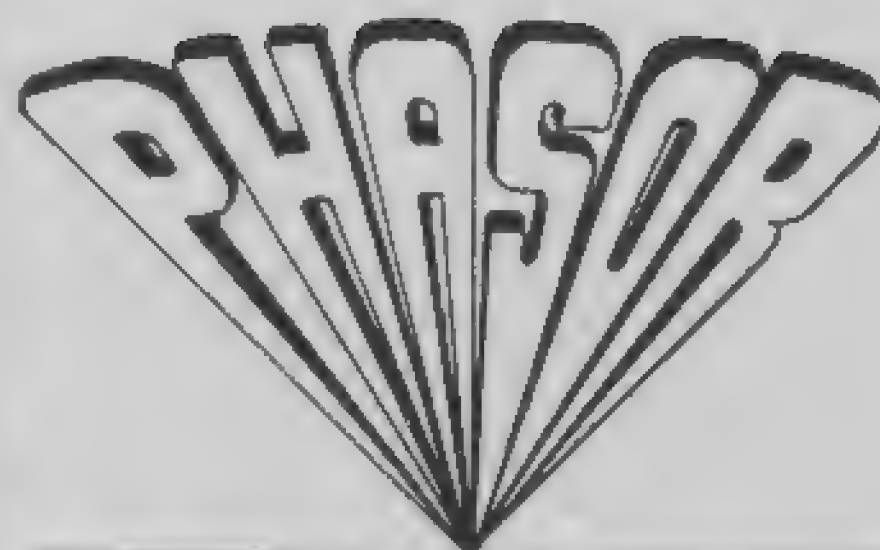
```



```

0000 REM PHASAP
0010 IF P<>0 THEN LET P=P-1
0020 PRINT AT 20,30;" ";AT 20,3
0030 FOR U=1 TO 5
0040 PRINT AT 0,0;"ALIEN FIRES"
0050 NEXT U
0060 LET R7=INT (RND*3)+1
0070 PRINT AT 0,0;" "
0080 GOSUB 1000
0090 IF R7<>1 THEN RETURN
0100 FOR Y=1 TO 5
0110 PRINT AT 0,0;"ALIEN FIRES"
0120 NEXT Y
0130 LET SH=SH-1
0140 IF SH<0 THEN GOTO 1000
0150 PRINT AT 12,30;SH
0160 RETURN
1000 REM PHASAP GRAPHICS
1005 PRINT AT R5,R6;" "
1010 PRINT AT 10,11;" "
1015 FOR L=1 TO 5
1020 PRINT AT 11,11;"L";TAB 13;"
1030 PRINT AT 11,11;" ";TAB 13;"
1040 PRINT AT 12,10;" ";TAB 14;"
1050 PRINT AT 12,10;" ";TAB 14;"
1060 PRINT AT 13,8;" ";TAB 15;"
1070 PRINT AT 13,8;" ";TAB 15;"
1080 PRINT AT 14,8;" ";TAB 15;"
1090 PRINT AT 15,4;" ";TAB 17;"
1100 PRINT AT 16,4;" ";TAB 17;"
1110 PRINT AT 17,4;" ";TAB 17;"
1120 PRINT AT 18,4;" ";TAB 17;"
1130 PRINT AT 19,0;" ";TAB 21;"
1140 PRINT AT 20,0;" ";TAB 21;"
1150 PRINT AT 19,0;" ";TAB 21;"
1160 PRINT AT 20,0;" ";TAB 21;"
1170 IF R7<>1 THEN PRINT AT 10,1
1180 IF R7<>1 THEN RETURN
1190 FOR F=1 TO 10
1200 FAST
1210 SLOW
1220 NEXT F
1230 NEXT L
1240 PRINT AT 10,11;" "
1250 IF SH<0 THEN RETURN
1260 GOSUB 5000
1270 PRINT AT 0,0;"HIT ""R"" FOR
NEW GAME."
1280 IF INKEY$="R" THEN RUN 2
1290 GOTO 2020
2000 PRINT AT 1,1;"CONGRATULATIO
NS";AT 2,1;" ";AT
4,1;"WE HEREBY AWARD YOU THE TIT
LE";AT 5,1;"OF: ""STAR"";R$;"
";AT 6,1;"KEEP ON FIGHTING, COMBO
Y."
2010 PAUSE 300
2020 CLS
2030 RETURN
3000 REM PHASAP
3010 FAST
3020 FOR U=0 TO 20
3030 PRINT AT U,0;"
3040 NEXT U
3050 SLOW
3060 FOR U=1 TO 50
3070 LET R9=INT (RND*4)+1
3080 IF R9<1 THEN LET B$="."
3090 IF R9=1 THEN LET B$="."
3100 PRINT AT INT (RND*20),INT (
RND*20),B$
3110 NEXT U
3120 RETURN

```



THE CHILDREN are screaming, the sun is roasting, it is a perfect day for the beach. You are the budding entrepreneur on the lemonade stand, trying to out-sell your rivals and lay the foundations of a fast food empire.

You start with capital of \$50 and have to decide how much to spend on advertising, how much on stock and what price to charge for each glass.

Lower-case letters in the listing signify inverse video (16K T/S1000,ZX81).

LEMONADE

```

278 PRINT "L E M O N
A D E"
279 PRINT "-----"
280 PRINT AT 10,0;"DO YOU REQUI
RE INSTRUCTIONS ? (Y/
N)"
290 LET A$=INKEY$
300 IF A$="Y" THEN GOTO 3000
310 IF A$="N" THEN GOTO 330
320 GOTO 290
330 CLS
340 PRINT AT 10,0;"HOW MANY PLA
YERS (2-4) ?"
350 INPUT P
360 IF P<2 OR P>4 THEN GOTO 350
361 CLS
362 PRINT AT 10,0;"HOW MANY DAY
S DO YOU WANT TO PLAY
(MAX=14) ?"
363 INPUT AD
364 IF AD<1 OR AD>14 THEN GOTO
363
369 CLS
370 DIM M(P)
380 DIM A(P)
390 DIM R(P)
395 DIM L(P)
400 DIM B(P)
410 DIM Q(P)
420 DIM I(P)
430 FOR F=1 TO P
440 LET M(F)=25
450 NEXT F
460 FOR F=1 TO P
470 LET A(F)=0
480 NEXT F
490 FOR F=1 TO P
500 LET R(F)=0
510 NEXT F
520 FOR F=1 TO P
530 LET B(F)=0
531 NEXT F
532 FOR E=1 TO AD
533 PRINT "L E M O N A D
E day ";E;AT 2,0;"(thirty two
graphic 7s)"
534 LET W=INT (RND*4)
535 IF W=0 OR W=3 THEN LET W$="
sunny"
536 IF W=1 THEN LET W$="rain"

```

THAT SURFING MADE ME THIRSTY!
HOW ABOUT A GLASS OF LEMONADE!

GREAT IDEA BRAD,
LET'S SPLIT!

```

537 IF W=2 THEN LET W$="snow"
538 PRINT AT 10,10;W$
539 PRINT AT 15,0;"LEMONDSVILLE
WEATHER REPORT"
540 FOR U=1 TO 100
541 NEXT U
551 LET AP=INT (RND*3)+1
552 LET BP=INT ((RND*4)+1)*0.5
553 FOR F=1 TO P
560 CLS
570 PRINT "L E M O N
A D E"
571 PRINT .."(twenty nine graph
ic 7s)"
580 PRINT .."player ";F
590 PRINT .."money $";M(F)
600 PRINT .."advertisements ?
EACH BOARD COSTS
$";AP
610 INPUT A(F)
660 PRINT AT 12,15;A(F)
670 PRINT AT 13,0;"
680 LET M(F)=M(F)-(A(F)*AP)
690 PRINT AT 9,7;M(F);"
700 PRINT AT 15,0;"bottles ?
EACH BOTTLE
MAKES 10 GLASSES"
710 PRINT "BOTTLES COST $";BP
720 INPUT B(F)
770 PRINT AT 15,8;B(F)
775 LET M(F)=M(F)-(B(F)*BP)
790 PRINT AT 9,7;M(F);"
800 PRINT AT 16,0;"

```

```

onade per glass ? Price of lem.
810 INPUT L(F)
820 LET L(F)=INT ABS L(F)
830 PRINT AT 18,28;L(F);"P"
840 FOR T=1 TO 100
850 NEXT T
860 NEXT F
870 IF W$="sunny" THEN LET G=17
880 IF W$="rain" THEN LET G=75
890 IF W$="snow" THEN LET G=10
900 CLS
910 PRINT "L E M O N A D
E day ";E

```


\$1.00 A GLASS IS THE PRICE!
TAKE IT... OR LEAVE IT!



YOU'VE GOT TO
BE KIDDING!

C'MON
BRAD,
LET'S
BEAT IT!



```

920 PRINT "(thirty two graphi
c 7s)"
921 PRINT AT 6.9:W$
925 LET V=INT (RND*50)+G
930 PRINT AT 6.9:W$
940 PRINT AT 10.0:"TODAY THERE
WERE "JV;" VISITORS"
950 FOR U=1 TO 125
960 NEXT U
970 CLS
980 DIM S(P)
990 FOR C=1 TO P
1000 LET Q(C)=(B(C)*10)
1010 NEXT C
1020 FOR C=1 TO P
1030 LET I=V*10
1040 LET S(C)=I/L(C)
1050 IF L(C)>30 AND L(C)<=50 THE
N LET S(C)=INT (RND*(V/(V-2)))
1060 IF L(C)>50 THEN LET S(C)=0
1070 LET Z=(RND*(A(C)*5))
1080 LET S(C)=S(C)+(Z*2)
1085 LET S(C)=INT (S(C)*0.75)
1090 NEXT C
1095 LET N=0
1100 FOR O=1 TO P
1110 LET N=N+S(O)
1120 NEXT O
1130 IF N>V THEN LET M=N-V
1140 IF N>V THEN LET M=INT (M/P)
1150 IF N>V THEN FOR Y=1 TO P
1160 IF N>V THEN LET S(Y)=S(Y)-M
1170 IF N>V THEN NEXT Y
1180 FOR H=1 TO P
1190 IF S(H)>Q(H) THEN LET S(H)=
Q(H)
1195 IF S(H)<0 THEN LET S(H)=0
1196 IF S(H)>V THEN LET S(H)=V
1200 NEXT H
1210 FOR J=1 TO P
1220 PRINT "L E M O N
A D E"
1230 PRINT "(twenty nine graphi
c 7s)"
1241 LET MY=INT (S(J)*L(J))/100
1242 LET M(J)=M(J)+MY
1250 PRINT "player "J;"
money $"M(J);"
1260 PRINT "you sold "S(J);
" glasses"

```

```

1265 PRINT "you had enough l
emonade for "L(J);
1266 PRINT "Price of lemondad
e per glass "L(J);"p"
1267 PRINT "advertisements "
A(J);
1270 PRINT "Profit $"MY-BP*
B(J)-AP*A(J)
1280 FOR U=1 TO 100
1290 NEXT U
1300 CLS
1310 NEXT J
1320 NEXT E
1330 GOSUB 10
1335 PRINT AT 5.19:
1340 FOR U=1 TO P
1345 PRINT TAB 19:"Player "JCHR$
(U+156)
1350 PRINT TAB 21:"$";M(U)
1360 PRINT
1365 PRINT
1370 NEXT U
1380 PRINT AT 3.0:"ANOTHER GAME
(Y OR N) ?"
1390 LET X$=INKEY$
1400 IF X$="Y" THEN GOTO 330
1410 IF X$="N" THEN STOP
8998 SAVE "LEMONADE"
8999 RUN
9000 CLS
9010 PRINT " L E M O N A
D E"
9020 PRINT "THE OBJECT OF
THIS GAME IS TO MAKE AS MUCH M
ONEY ($) AS POSSIBLE."
9025 PRINT "YOU OWN A STALL NEAR
A BEACH IN THE RESORT OF LEMOND
SVILLE. YOU SELL LEMONADE AND TR
Y TO MAKE A PROFIT. TO START WITH
YOU HAVE $50 TO BUY LEMONADE
FROM THE WHOLE-SALER."
9030 PRINT "YOU CAN ALSO ADVERTI
SE YOUR LEMONADE BUT IT ALL
COSTS MONEY."
9040 PRINT AT 21.0:"PRESS ANY KE
Y"
9050 IF INKEY$="" THEN GOTO 9050
9060 GOTO 330
9500 FOR F=1 TO 5
9510 NEXT F
9520 RETURN

```


MOST computer games require nothing except a quick finger on the cursor key. Most of the rest, those which require a bit of brain power, are adaptations of games when the word computer meant a person with an abacus.

London Bridge is one of the few routines we have seen which is original, was written for the computer, and which calls for nerve, thought and luck.

The display consists of a graphic representation of the bridge, seen from above, with the roadway made up of a random mix of the

numbers 1 to 5, representing five types of flagstone. You are required to cross to the other bank but, as you would expect, London Bridge is falling down.

The computer will give you a number, perhaps 4. That tells you that one of the type 4 stones is about to fall into the river. In selecting your next move, therefore, you can gamble by moving onto a 4 or play safe by selecting a different number.

The player enters his move by following the nine-number grid displayed under "INPUT" in the bottom left of the screen; 7, for ex-

ample, will move you left and down and 2 will send you backwards.

Invalid moves are ignored. You score 10, 20 or 50 points respectively for each move forwards, sideways or backwards, but taking risks trebles those scores and a high score is necessary to beat the world record of 1,700. Beware — don't dally too long at the start of the bridge — you may be cut off by successive collapses, and don't shilly-shally near the south bank because that is where the bridge is weakest.

We were impressed by the program and scored 1,900 after 12 attempts. (16K T/S1000,ZX81.)

London Bridge

```

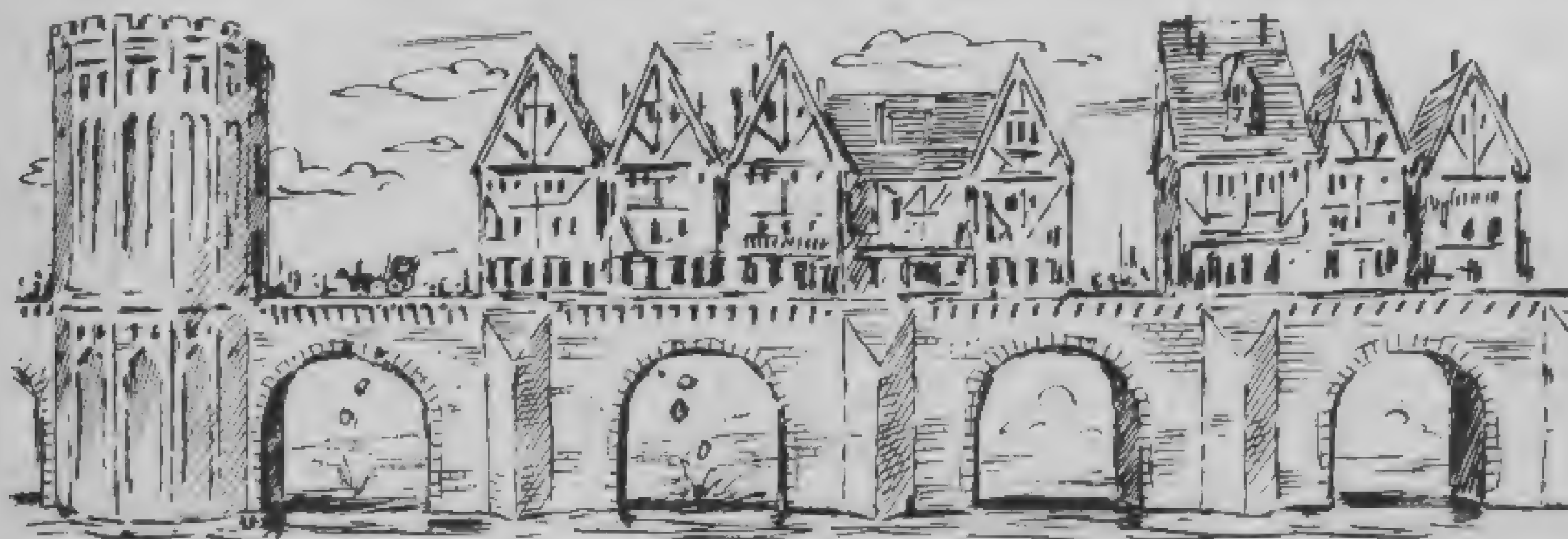
5 FAST
10 RAND 0
20 DIM A(66)
30 PRINT AT 2,9;"LONDON BRIDGE"
..
40 LET UR=1700
50 PRINT AT 16,25;"UR=";UR;TAB
11;"#";TAB 0;"INPUT";TA
B 1;"123";TAB 1;"456";TAB 1;"789"
..
55 PRINT AT 6,11;"# # # # # "
60 FOR I=1 TO 11
70 PRINT TAB 12;"# # "
80 NEXT I
90 FOR N=11 TO 60
100 LET A(N)=INT (RND*5+1)
110 LET A$=CHR$ (26+A(N))
120 LET M=(N-1)/5
130 GOSUB 500
135 NEXT N
140 LET N=6
145 SLOW
150 LET A(N)=-28
155 PRINT AT 20,20;"TO COLLAPSE"
..
160 LET DROP=INT (RND*(67-N)+N-6)
170 IF A(DROP)<=0 THEN GOTO 160
180 PRINT TAB 25;A(DROP)
190 INPUT DIR
200 LET I=(INT DIR-1)/3
205 LET M=(N-1)/5
210 LET J=M-INT M+I-INT I
220 LET N1=N+5*(INT I-1)+3*(I-INT I)-1
230 IF DIR<1 OR DIR>9 OR J<0.1 OR J>1.4 OR N1<6 THEN GOTO 190
235 IF A(N1)<=0 AND N1<=60 THEN GOTO 190

```

```

240 IF N1>60 THEN LET A(N1)=-28
250 LET A$=CHR$ (26+A(N))
260 GOSUB 500
270 LET M=(N1-1)/5
280 LET A$=CHR$ (156+A(N1))
290 GOSUB 500
300 PRINT AT 20,20;"
";TAB 25;" "
310 FOR J=1 TO 70
320 NEXT J
330 LET M=(DROP-1)/5
350 LET A$=" "
360 GOSUB 500
370 IF N1=DROP THEN GOTO 600
380 IF N1>60 THEN GOTO 800
390 LET SCORE=10*(3-INT I)+10*(2-INT I)*(1-INT I)
400 IF A(N1)=A(DROP) THEN LET SCORE=SCORE*3
410 GOSUB 900
420 LET A(DROP)=0
430 LET N=N1
440 GOTO 155
500 PRINT AT 5+INT M,13+5*(M-INT M);A$
510 RETURN
600 PRINT AT 20,16;"YOU HAVE FALLEN";TAB 18;"IN THE WATER"
700 STOP
800 LET SCORE=1000
810 GOSUB 900
820 STOP
900 LET A(1)=A(1)+SCORE
910 PRINT AT 11,22;"SCORE ";SCORE;" "
920 PRINT AT 13,22;"TOTAL ";A(1)
930 RETURN

```





PROBABILITY

POISSON'S FORMULA is a method of calculating the possibilities of recurrence of an event, based on the number of occurrences in the past.

For this listing, the time should be adjusted so that the number of occurrences is in the range 3 to 12. The range could be extended upwards if required, but 2 has been omitted as it would mean an unreliaibly small sample.

The formula here is applied with a correction factor but that will not distort the results, since the same percentage is applied to all answers, thus keeping them in the same proportion. (1K T/S1000,ZX81)

```

9 CLEAR
10 PRINT "    LONG TERM PROBABIL
ITY STUDY"
11 LET S=0
12 LET T=0
13 LET U=0
14 LET V=0
15 LET W=0
16 LET X=0
17 LET Y=0
18 LET Z=0
19 LET PP=0
20 LET RR=0
21 PRINT
22 PRINT "INPUT THE MAXIMUM OC
CURRENCES IN ANY ONE UNIT OF TIM
E"
23
24 PRINT
25 PRINT "    RANGE ALLOWED
0 TO 10"
26 INPUT A
27 CLS
28 PRINT "INPUT TOTAL OCCURENC
E"
29
30 INPUT B
31 PRINT
32 PRINT "INPUT TOTAL TIME"
33 INPUT C
34 CLS
35 LET D=B/C
36 LET E=(1+(1/B))*B
37 LET F=1/(E*D)
38 LET G=F
39 LET H=D*F
40 LET I=D**2/2*F
41 IF A=3 THEN LET S=D**3/6*F
42 IF A=4 THEN LET T=D**4/24*
F
43 IF A=5 THEN LET U=D**5/120
*F
44 IF A=6 THEN LET V=D**6/720
*F
45 IF A=7 THEN LET W=D**7/504
*F
46 IF A=8 THEN LET X=D**8/403
20*F
47 IF A=9 THEN LET Y=D**9/362
880*F
48 IF A=10 THEN LET Z=D**10/3
688800*F
49 IF A=11 THEN LET AA=D**11/
39916800*F

```

```

237 IF A=12 THEN LET BB=D**12/4
798016000*F
240 PRINT "PROBABILITY OF", "PER
CENT"
250 PRINT
251 REM CORRECTION FACTOR
252 LET N=P+Q+R+S+T+U+V+W+X+Y+Z
+AA+BB
253 LET PP=(INT (P*10000/N+0.5)
)/100
254 LET QQ=(INT (Q*10000/N+0.5)
)/100
255 LET RR=(INT (R*10000/N+0.5)
)/100
256 LET SS=(INT (S*10000/N+0.5)
)/100
257 LET TT=(INT (T*10000/N+0.5)
)/100
258 LET UU=(INT (U*10000/N+0.5)
)/100
259 LET VV=(INT (V*10000/N+0.5)
)/100
260 LET WW=(INT (W*10000/N+0.5)
)/100
261 LET XX=(INT (X*10000/N+0.5)
)/100
262 LET YY=(INT (Y*10000/N+0.5)
)/100
263 LET ZZ=(INT (Z*10000/N+0.5)
)/100
264 LET AAA=(INT (AA*10000/N+0.
5))/100
265 LET BBB=(INT (BB*10000/N+0.
5))/100
266 LET A$="0 OCCURRENCES"
267 LET B$="1
268 LET C$="2
269 LET D$="3
270 LET E$="4
271 LET F$="5
272 LET G$="6
273 LET H$="7
274 LET I$="8
275 LET J$="9
276 LET K$="10
277 LET L$="11
278 LET M$="12
279 PRINT A$,PP,B$,QQ,C$,RR,D$,
SS,E$,TT,F$,UU,G$,VV,H$,W$,I$,XX
,J$,YY,K$,ZZ,L$,AAA,M$,BBB,PP
+QQ+RR+SS+TT+UU+VV+WW+XX+YY+ZZ+A
A+BBB

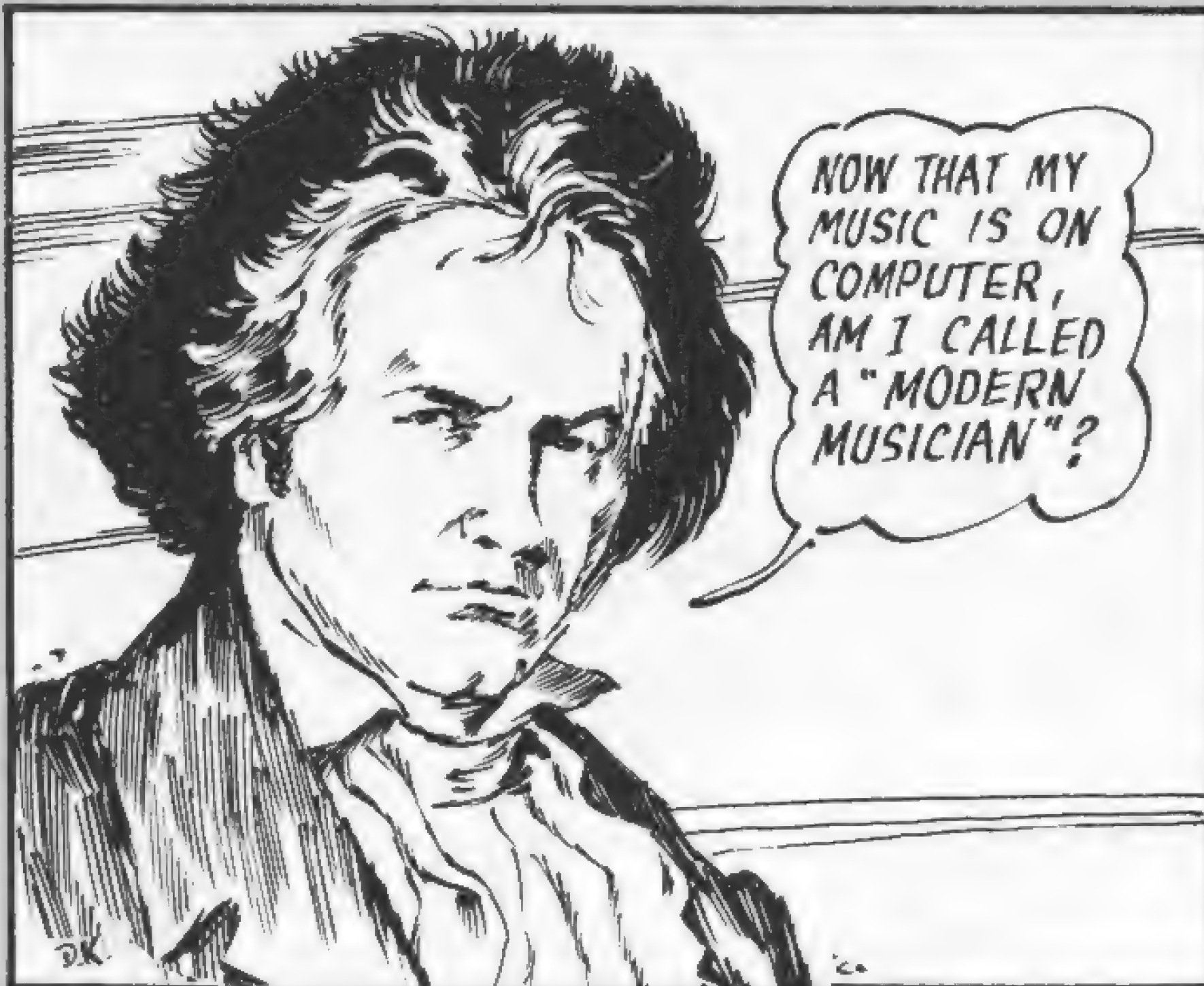
```


BEETHOVEN

```

1 REM 12345678901234567890123
456789012345678901234544
2 REM .....
.....
.....
10 LET A$=""
20 LET A$=A$+"FFF"
25 LET O=16567
30 FOR I=1 TO LEN A$-1 STEP 2
40 POKE O,(CODE A$(I)-28)*16+CODE A$(I+1)-28
50 LET O=O+1
60 NEXT I
70 FAST
80 LET K=USR 16546
99 STOP
100 SAVE "BEETHOVEN"
110~PRINT "*****
*****BEETHOVEN
*****"
120 PRINT "PROGRAMME CREATED
BY S. CRAINIC FOR THE SINCLAIR Z
X81 +16K"
130 PRINT "EACH SOUND CORRESP
ONDS TO AN HEXADECIMAL VALUE. I
N ORDER TO OBTAIN THE DESIRED M
ELODY, YOU MUST ENTER SUCCESSIVELY
IN LINE 10 (LET A$=""...)"
"THE HEXADECIMAL CODE OF EACH
SOUND IN THEIR ORDER IN THE MEL
ODY."
140~PRINT "THE SOUNDS HAVE EQUAL
LENGTHS. A LONGER DURATION OF
A GIVEN SOUND COULD BE OBTAIN
ED BY ENTERING MANY TIMES SUCCE
SSIVELY THE CODE CORRESPONDING TO
THE SAME SOUND. INTERVALS ARE
OBTAINED BY ENTERING THE ""00"" V
ALUE."
145 PRINT AT 21,0;"HIT A KEY TO
CONT."
150 IF INKEY$="" THEN GOTO 150
155 CLS
160 PRINT "NOTE 1ST SCALE
2ND SCALE-----"
165 DIM B$(2,24)
170 LET B$(1)="F0E508CFC3B8ADA5
9C948B83"
175 LET B$(2)="7A736B67605A5651
4B484440"
180~LET C$="C C+;D=D D+;E
-E F F+;G=G G+;A=A A
+;B=B "
190 FOR I=1 TO 12
200 PRINT C$(I*5-4 TO I*5);TAB
11;B$(1,I*2-1 TO I*2);TAB 24;B$(
2,I*2-1 TO I*2)
210 NEXT I
220 PRINT "AS EXAMPLES, SOME
MELODIES WERE CODED IN LINES 100
0... IF YOU WANT TO ""PLAY"" O
NE OF THEM, ENTER run 1000, OR
1010... make the tone o
f your tv set louder AND newli
ne."
230 PRINT AT 21,0;" HIT A KE

```



BEETHOVEN is a remarkable program which allows you to produce music from your T/S1000,ZX81. Stephane Crainic of Paris has linked hex values to the tones available from the speaker of your television set and has produced a table allowing you to convert the notes of the musical scale into those values.

When you have typed in the program, enter GOTO 110 so that you can read the instructions and the table of scales and hex codes. Then transpose your tune into hex. After

reading the instructions and pressing keys to continue, the screen will show 0/9998.

Enter LIST 10, EDIT, and alter the A\$ to the list of the hex values into which you have converted your tune. Increase the volume of your TV, enter GOTO 1 and your tune will be produced. The notes produced are all off-key but the quality is certainly acceptable when you consider how they are made. Lower-case letters in our listing signify inverse video (16K T/S1000,ZX81).

```

Y TO CONT "
240 IF INKEY$="" THEN GOTO 240
245 CLS
247 PRINT "EXCUSE ME, I'M WORK
ING..."
248 FOR I=1 TO 30
249~NEXT I
250 FAST
255 RUN 9990
1000 REM happy birthday
1005 LET A$="B8B800B800A5A500B8B
800B8B80094949494000B8B800B800A
5A500B8B800B8B8009494949400B8B8
0B80060606073737300B8B8B80094940
0A5A5A500B8B8006B737300949400B8B
300949494"
1009 GOTO 20
1010 REM 40th symphony
1011 LET A$="B8C300C3C300B8C300C
3C300B8C300C3C37A7A7A007A6394940

```

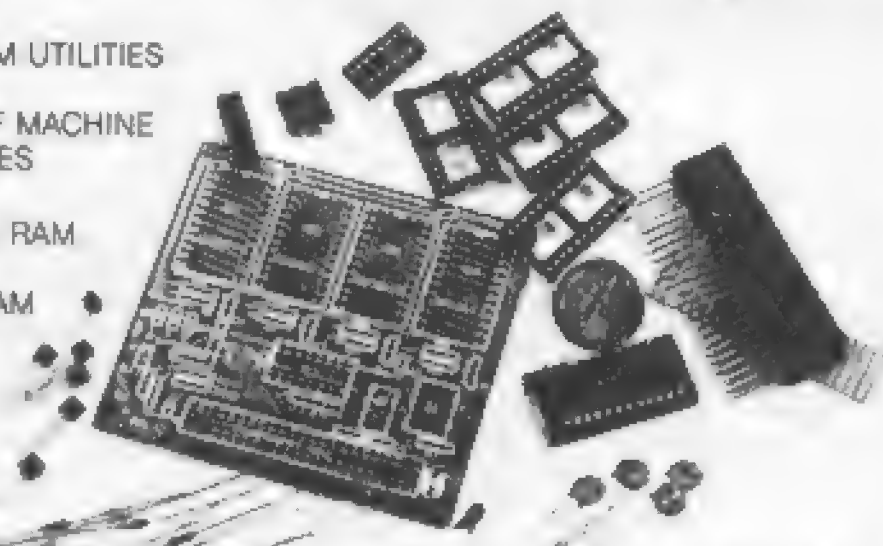
```

094A5B8B800B8C3D00000D0D0B800C3D
8000B8C3D0B8000B800C3D0B800B8B3B
3B000B3949C9C000C8B8C3C300C3D0F0F
000F0F0007A8300B3B36B6B9C9C83B39
494C3C3007A8300B3B36B6B9C9C83B39
4947A7A007A8334A5B8B8C3C3B8B8"
1019 GOTO 20
9989 STOP
9990~LET A$="7B3D20FDC906E05EAFB
B280CDBFECDB240D3FFCD824018050E0
50C20FD10E8C921B740CD8740237EFEF
F20F7C9"
9991 LET O=16514
9992 FOR I=1 TO LEN A$-1 STEP 2
9993 POKE O,(CODE A$(I)-28)*16+CODE A$(I+1)-28
9994 LET O=O+1
9995 NEXT I
9996 SLOW
9997 CLS
9998 CLS

```


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(**OKLAHOMA S.U.G. Newsletter 1/3**)

We found the documentation to be far superior to that of most hardware we've received.
(**S.U.N. Newsletter Nov/Dec 82**)

For versatility this is even better than an EPROM... ranks quite high on the list of "must-haves".
(**SYNC Magazine Mar/Apr 83**)

INTRODUCTION

This memory board is designed to fill the transparent 8K block of memory (from 8 to 16K) in a ZX81-16K system. This area of memory is an ideal place to store, either permanently or temporarily, machine language routines or data which are to be used by the BASIC system.

A sample display routine, a program—merging routine, and procedures for storing utilities on tape are included with the kit.

The use of HM6116LP 2K CMOS RAM memory IC's with their own reserve power supply means that routines stored in the RAM are nonvolatile — the RAM retains its memory even when the ZX81 is switched off or reset. Moreover, being RAM, the routines you store in the memory are easily modified. The lithium cell supplied with the board will maintain sufficient reserve power for almost ten years.

ASSEMBLY

Complete step-by-step instructions in a 20 page manual make assembly of the board easy. Construction takes between two and three hours. The kit (pictured above) is complete with a silkscreened solder-masked printed circuit board, all capacitors, resistors, transistors, sockets, connectors, integrated circuits, and the lithium cell. The board is supplied with one 2K CMOS 6116LP-3 RAM — it will accommodate three more for a total of 8K.

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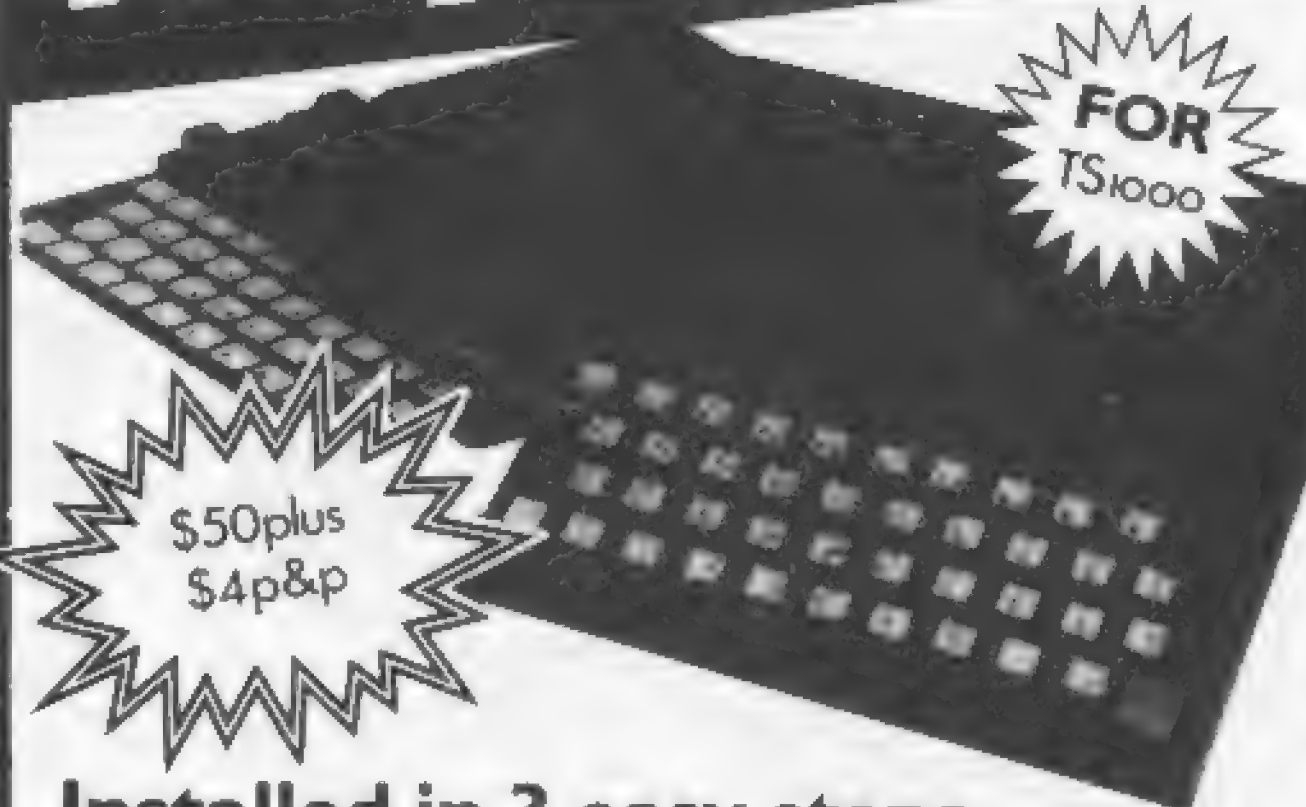
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A personal computer with

When I started my business career, not so long ago, the slide rule and mechanical calculator were the mainstays of professional desktop computing power; but that was before the dawn of the integrated circuit. I can remember the day of my first electronic assistant, a \$400 calculator that could add, subtract, multiply and divide. Oh yes, it also took square roots. Now 12 years later, we have at one quarter the price, a Timex Sinclair computer.

Although it is now possible to replace the electronic calculator with a remarkably priced desktop computer, is it worthwhile for the business person to make the change? Can tasks be done with ease at the office desk? Can the desktop computer take on some of the chores currently performed by mainframe or mini computers? The answers to these questions hinge on what work has to be done at the desk, on the time factors and on available software for the tasks at hand.

The first question you can resolve for yourself by an examination of your work needs. Ask yourself, "What do I do now that is time consuming or that I have to rely upon a data processing department to do for me, resulting in untimely information?" Secondly, you should examine whether having this work done at your desk would make you better informed, efficient and generally better able to do the remainder of your work.

Once you have looked at your job in this way, you should have an idea of where and how added computing power might help you. Next look at the process and information needed in these potential jobs for your Timex Sinclair. Simply put, the job to be done and the information required must match the capabilities of the machine.

Chicago's James P. Biers has discovered that his T/S1000 is a slide rule, calculator, desk-top planner, and more; and looks at business software.

A job that requires a large amount of stored data or access to the corporate base would probably not be a good choice for desktop processing. On the other hand, an examination of a cash flow and the discounting of the same to get a present value might well be an excellent choice.

Having made the decision for a desktop computer, you must either find packaged software or be able to write your own. Since your time and talents may not lie in the direction of software development, the package route may be your best bet.

Now let's backtrack briefly to see how this task of examination and software selection might work. Imagine yourself employed by a firm that makes several products containing materials which must be purchased in the open market and

whose prices tend to have wide swings from time to time. Imagine further that two primary functions of your job are predicting these price swings and the preparation of weekly reports on the current breakeven point for your company's products.

As your first job requires access to a large data base and perhaps very involved math techniques, it may not be a good choice for desktop processing. There may also be strong arguments for consistency and for the need to avoid personal bias that will work against a decision for desktop processing of this job.

Your second job may, however, be an excellent choice for desktop computing. Although there might be several inputs to the breakeven

All the lady needed was . . .



many office applications

equations, many of these may be relatively constant and be known for a month or even a year in advance, so that their frequency of change would be small. Such inputs might be labor, fixed machinery charges, insurance and the cost of other materials that may have stable prices or be under long term contract prices. The only changing inputs to the breakeven equations would consist of the materials that have wide price movements.

In this hypothetical situation, the materials price projections are not a good choice while breakeven analysis is a strong possibility for desktop computing.

When reports are needed weekly, as in our given example, it would be convenient for you to have the desktop computing power. This would give you answers faster and more accurately than hand calculation methods and perhaps is more timely than submitting your information to a data processing department. Added advantages may be more flexible travel and meeting

schedules because of either saved time over manual methods or in not having to meet input schedules of the data processing department. Also it may be possible to use even more current prices than at present, because of the lessened time now needed to prepare your reports.

Once you have decided you want desktop computing for your breakeven analysis, is there software available at a reasonable cost for the Timex Sinclair? The answer is yes. There is software that offers a breakeven analysis program as well as programs for examining cash flow problems and calculating depreciation and rates of return.

We have discussed one business application for the Timex Sinclair 1000. As people discover the substantial capabilities of this machine in the business area, they are seeking for more and more software. Programmers and software firms are producing it. This in turn leads to more business use and further software demand.

Currently the sources listed at the end of this article are offering

business software. Among the substantial ones are Gladstone Electronics in Buffalo, New York, RUN-IT Software Club in Chicago, Illinois, and Softsync, Inc. in New York City.

I have authored two programs for business. Business Pac I is a comprehensive set of programs to help you manage your cash flow, measure your rate of return, keep track of depreciation and establish your production and sales breakeven levels. Business Pac II is for project scheduling and would be of assistance to anyone who needs to keep track of project hours, billings, variances and staff work loads. Soon to be released are a Personal Finance package that includes a check book/register program, a mortgage and rule of 78 loan program and net worth and budget programs. A personal investments package is also coming on the market. Most software companies are adding business or related packages to their line.

RUN-IT offers statistics for mean, standard deviation, regression and other analysis and data sorting. Real Estate Advisor to manage residential rental property and measure rates of return, and Computer Awareness series that teaches computer and programming concepts through sample programs. RUN-IT also offers a distinctly unique program called Graph-It which lets you enter an equation, its variables and constants as data without any programming. Graph-It analyzes the equation and plots the results in polar, or two or three dimensional form. This program would appear to have great applications in engineering, business, science, mathematics and teaching when you need to display a picture for clarity, impact or increased understanding. RUN-IT has plans for a financial assistance

... a T/S1000 to help organize her business



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Business

“... breakeven analysis is a strong possibility for desktop computing”

package called Market-Guru and a commercial real estate advisor program.

Softsync produces a program, “The Financial Manager and Record Keeper,” designed for small business budget management and record keeping. Their “Stock Market Calculator” was designed and written by an experienced stock market executive in conjunction with a leading brokerage firm. It contains three programs, Net Price Worksheet, Profit/Loss and Covered Write Worksheet. The first calculates commissions on stock and option investments. Profit/Loss uses the stock or option buy and sale prices to calculate commissions and net dollars and gives profit or loss. The third program is unique in the field. It allows you to try different prices and investment alternatives without having to re-enter all data every time.

DATA-ASSETTE offers, among

other programs Finance/Bank for maintaining check book balances, ZX99 TEXT (a word processor) and the Budget/Forecaster which assists in the preparation of personal budgets.

Budget/Forecaster lets you establish categories of income and fixed and variable expenses for a twelve month period. You may enter information by month or category, obtain a summary report and save the results on tape. A built-in calculator lets you work with your budget numbers without exiting the program.

The Timex Sinclair is undoubtedly a business machine. Its capabilities in this area will receive greater recognition as more software becomes available. The Timex Sinclair has a definite place in the office.

Q/A

SOME BUSINESS SOFTWARE SOURCES

Data-assette

Circle 11 on Reader Inquiry Card
Gladstone Electronics

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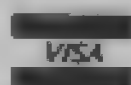
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Inside the T/S1000,ZX81

IF you get the chance, look inside an IBM PC. You'll see acres of board covered with countless chips, resistors, capacitors and the like. It all looks very mysterious and impressive. Instead of staring open-mouthed in awe and dreaming wistfully of the day you own one, comfort yourself with the knowledge that your seemingly lowly T/S1000,ZX81 is a superior technological achievement.

Basically, all computers work the same way, so studying the inner components of your T/S1000,ZX81 is an easy way to learn about computer hardware in general.

What makes Clive Sinclair a genius . . .

The photographs in this article may not completely satisfy your curiosity, so if you must open your computer, don't use a crowbar; instead, remove the screws under the leg pads with a small Philips screwdriver. Now the mother board is exposed. (I haven't a clue as to why they call it a mother board, and I'm still waiting for father boards and little baby boards to come along.)

You will probably be unimpressed by what you see. Indeed, you may wonder how anything so small and ordinary-looking can function as a computer. What makes Clive Sinclair a genius is that he has managed to squeeze all that computer power into a few miniscule chips that cost very little to manufacture and are easy to test. We as consumers are the winners, getting a unique computer with features

André Roussil lays bare the T/S1000 to show you Clive's "miracle"

otherwise attainable only in higher-priced units.

All computers use the bit as their basic functional unit. A bit is essentially an on/off switch that is permanently set in the ROM (read-only memory) but is switchable in the RAM (random access memory). The ROM switch is maintained in position even when the power is cut-off. The ROM has the memory that tells the computer how to be a computer. In the RAM, when the power is shut off, the switches do not maintain position, hence its memory is lost.

. . . the recognized leader among 8-bit microprocessors . . .

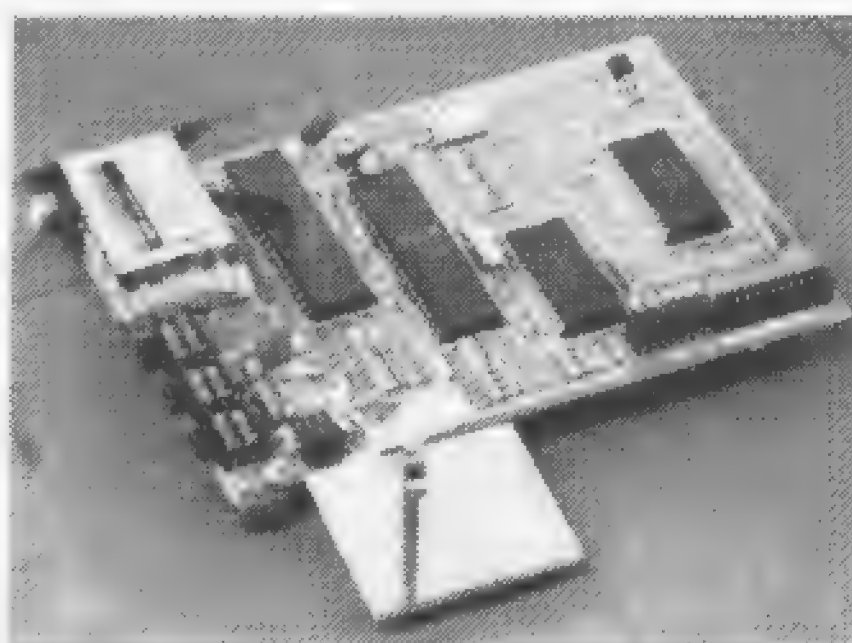
The T/S1000,ZX81 has a ROM chip and a static RAM chip, and various parts on the board that are supportive of these chips. Alone, the RAM and the ROM

are just a bunch of bits without purpose; they need an interpreter. A microprocessor is basically a program called a "microprogram", whose function is to organize those memory bits into blocks. These blocks are then interpreted as binary numbers at definable addresses.

The heart of the T/S1000,ZX81 is the Z80 A central processing unit (CPU), the recognized leader among 8-bit microprocessors. Subsequent editions of this chip, such as the Z80 B and C, put 16-bit processors to shame. In choosing this powerful chip, Clive Sinclair has utilized chip technology to the fullest.

The Z80 A is an 8-bit processor because it refers simultaneously to 8 bits in an address. Internally, the Z80 A can deal with up to 16 bits simultaneously on a type of scratch-pad called the register pairs. With 16 bits, you can make a binary number of up to 65553, and this is the maximum number of addresses the Z80 A can form. Sinclair rendered one leg of the chip dysfunctional for this purpose, so the actual addressing range is 32768. The processor not only interprets the numbers it finds as data, but also the numbers it finds as instructions. This allows you to copy the contents of certain addresses onto the computer's scratch-pad, test and process these numbers, make logical decisions affecting the computer's next act, and write into addresses.

By organizing 8-bit numbers into a certain order in ROM or RAM, the programmer creates



Taking a PEEK inside: use a screwdriver, not a crowbar.

the "macroprogram" in machine language. The first such program to be installed resides at the beginning of memory and is called the monitor. Many computers have a small permanent program, sufficient to control screens and load full systems into RAMS. The T/S1000,ZX81 has a full monitor system located in a ROM chip.

... all roads lead to the Sinclair logic

But the master touch is the chip which holds the Sinclair logic. It acts as an intermediary between the various peripherals and chips, and also selects the memory to be accessed, ROM or RAM. In fact, the other chips need its permission to function. With this switching terminal, Sinclair was able to make a four-chip machine. In the hardware illustration accompanying this

article, you can see that all roads lead to the Sinclair logic.

When you power up through the 9-volt entry (located on the side), the current passes through a regulator and is stabilized at 5 volts. Heat from the process is diffused by an aluminium radiator, and escapes through slots in the bottom of the casing. Once on, the microprocessor reads the contents of the first address, then goes through an initialization procedure according to the ROM program. Memory is cleared, parameters set up, and the display file is prepared — a step that starts with a ripple moving down the screen and ends when the cursor finally appears.

On the circuit board is a connector with a folded plastic strip leading under the keyboard. When you press a key, you cause two metallic strips crisscrossed beneath it to contact with each other, so creating a circuit. By reading these circuits, the processor is able to produce two 8-bit numbers, thereby distinguishing the key pressed as well as the mode the computer was in when the key was pressed. When the computer is in SLOW mode, it reads the keyboard 50 times a second, and maintains the screen image at the same rate. It executes any program in RAM when the screen is blank. In FAST mode, the Z80 A is not preoccupied with these tasks, and so has more time to execute your program.

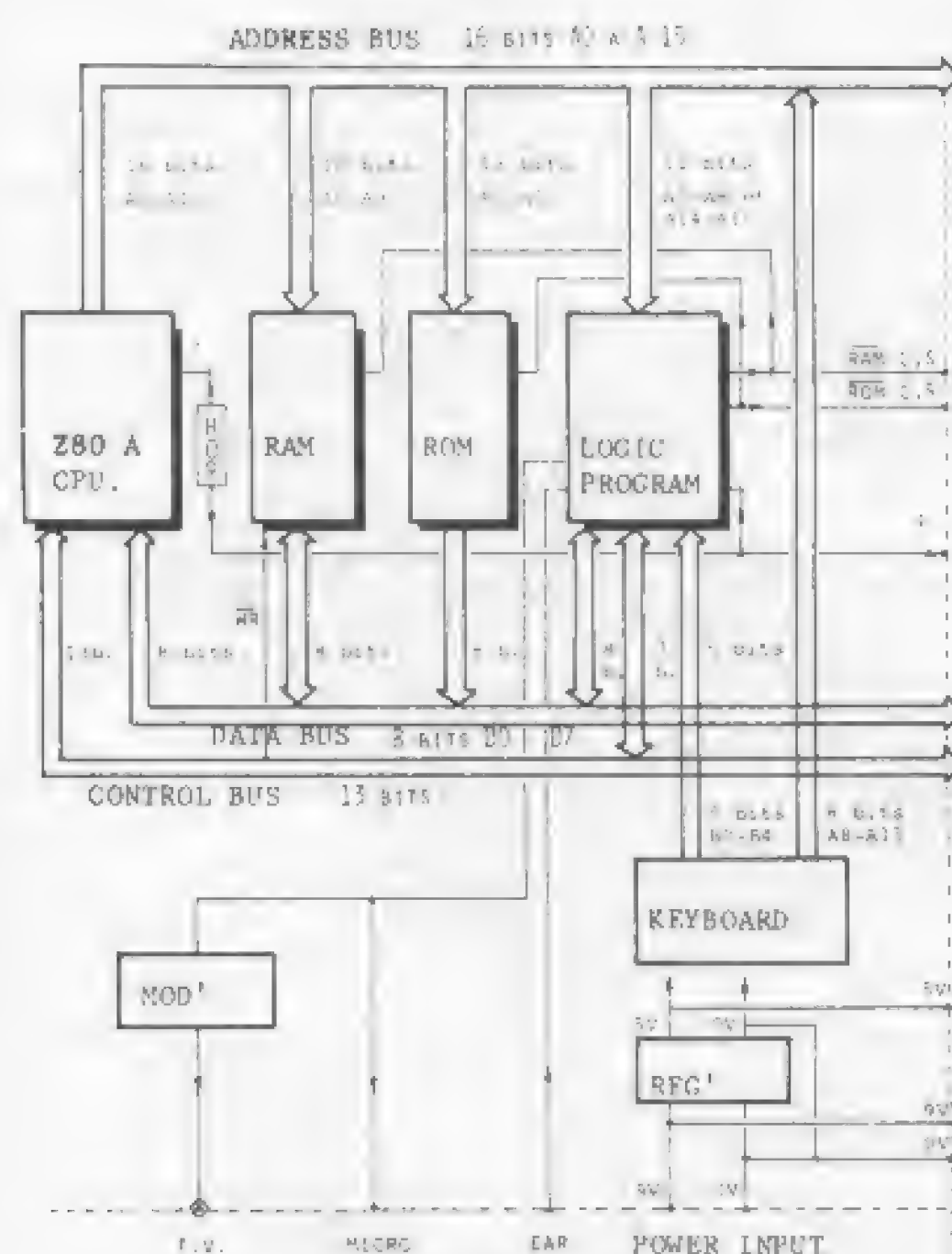
Even the most modest request programmed into the 1 or 2K of RAM located on the board generates furious activity. Not only does the Z80 A control the television, read the keyboard, and interpret commands, it constantly allocates blocks of memory to take advantage of all

MEMORY ORGANIZATION OF THE TIMEX SINCLAIR

00000
ROM
8192
8193
UNCOMMITTED
16388
16389
SYSTEM VARIABLES
16508
16509
PROGRAM AREA
MAX 32768. Position can vary
DISPLAY FILE
..... Position can vary
VARIABLES
..... Position can vary
COMPUTER WORK SPACE
STACK RAMTOP

available space. Finally, it executes your program, but that turns out to be the least of its worries. With no supplementary RAM attached to the edge connector at the back, the operating system doesn't reserve space for screen prints. It creates space and rearranges in-use memory into suitable locations on the fly. In this way, you get the most from the limited memory of the RAM on the board. (Expansion RAM is available up to 64K.)

Supplementary memory is storage space that frees the program area for Basic and machine language programs. If you consult the memory chart on this page, you will notice a blank space between the addresses 8000 and the 16000. RAM, ROM or EPROM may be situated here, but only machine language can be executed. This space is most suited to expanding the operating system or for cartridge plug-in programs. Maybe Sinclair will decide to do something with this area later. More programs of the same calibre as the present ROM



Simplified schematic of the T/S1000,ZX81.

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would be most welcome.

There are many peripheral devices available that plug into the edge connector and improve performance. The most notable are printers and push-button keyboards. There is also hardware on the market that works with the ear and mic plugs at the side of the T/S1000,ZX81; they improve the LOAD and SAVE functions involving your cassette recorder. Enough add-ons can make the T/S1000,ZX81 unrecognizable, but that small circuit board with its few unimpressive looking chips is where the action really is.

BASIC PROGRAMS use machine language as an interpreter. In turn, another, more primary language in the microprocessor interprets machine codes.

Where does it all stop? Which language did they use to write the microprogram in the CPU? The program must have been written on a computer without a microprocessor, so the first program of all was written directly in binary — one bit at a time. They really had no choice! If your basic program asks for any input at all, then you too have created a language. Chips are just tools that allow various interdependent languages to work together. They are convenient but not absolutely essential to computing.

... You sense its potential when you look inside ...

Which chips to use in a computer is a practical question in-

volving financial, technical, and marketing considerations. There is no all-purpose computer. Features you do not find useful in a given system (especially in a small computer system) are just so much wasted power for you. Sinclair could have included any number of specialized chips to increase the features available on his creation. So the T/S1000,ZX81 doesn't come with 200 colors and an assortment of whistles and bells. Neither does the IBM. Though the T/S1000,ZX81 is fun to play with and priced like a toy, it is most definitely no toy. First and foremost, it is a learning tool — with a potential for games and business applications. You sense its potential when you look inside. ☐/☐

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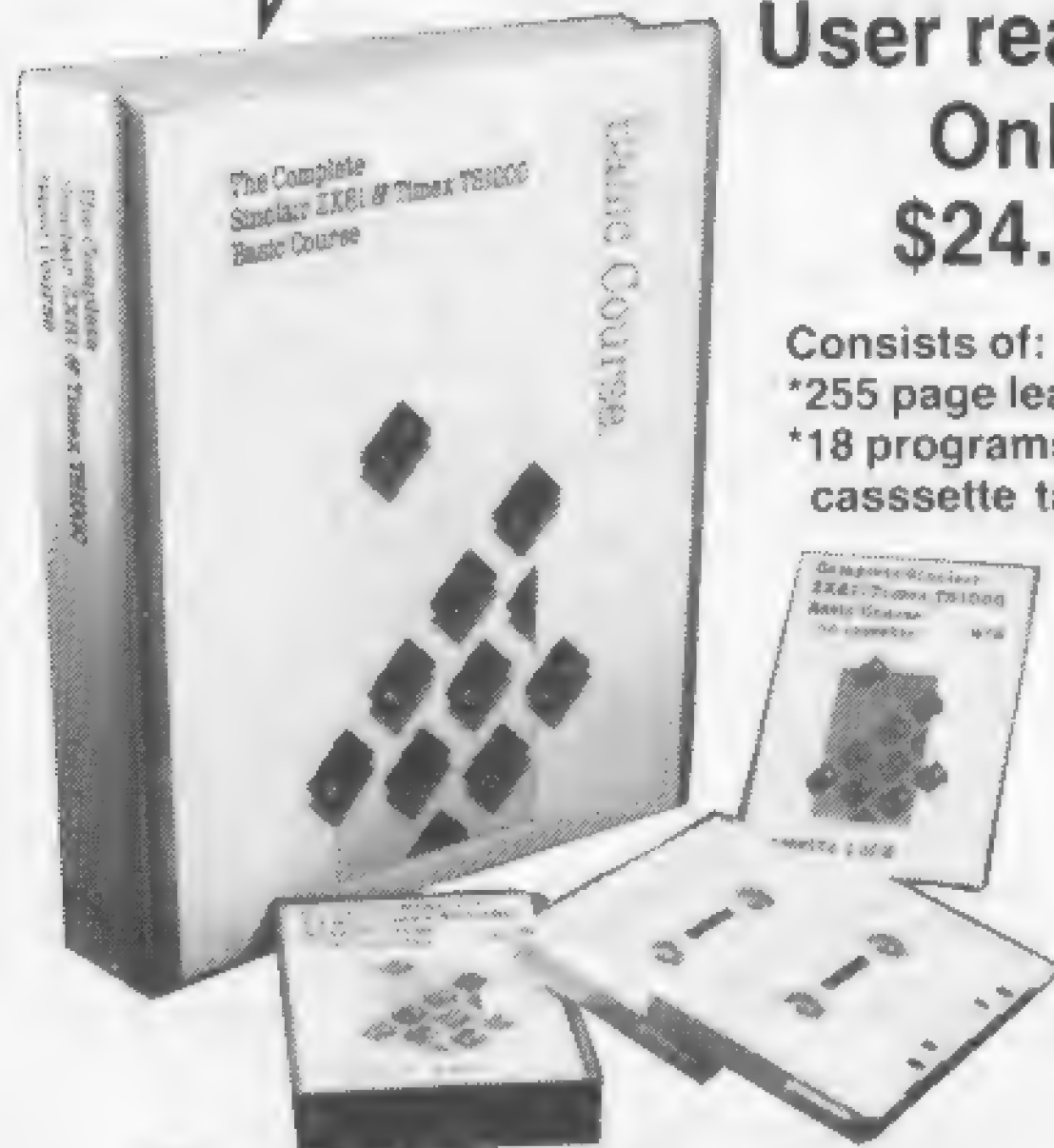
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```

100 LET A$="
200 LET B$="
250 LET C$="
300 PRINT A$,A$
400 PRINT B$,B$
500 PRINT B$( TO 7),B$
600 PRINT B$( TO 7),B$
700 PRINT A$,B$
800 PRINT " ;B$(2 TO ),B$
900 PRINT " ;B$(2 TO ),B$
1000 PRINT B$,B$
1100 PRINT A$,A$
1200 PRINT AT 7,22;C$
1300 PRINT AT 9,24;C$
1400 FOR I=0 TO 248
1450 IF I>66 AND I<128 THEN GOTO
1500 PRINT CHR$ I;
1600 NEXT I
1700 PRINT AT 10,0;" WE SPEAK Y
OUR LANGUAGE
SYNTACTIC SUM: 22174, 8K ROM
  
```

SQ

WE SPEAK YOUR LANGUAGE 0123
 456789ABCDEFGHIJKLMNPOQRSTUVWXYZ
 RNDINKEY\$PI
 +--+0123456789ABCDEFGHIJKLMN
 PQRSTUVWXYZ"AT TAB ?CODE VAL LEN
 SIN COS TAN ASN ACS ATN LN EXP
 INT SQR SGN ABS PEEK USR STR\$ CH
 R\$ NOT ** OR AND <=>=<> THEN TO
 STEP LPRINT LLIST STOP SLOW FAST
 NEW SCROLL CONT DIM REM FOR GOT
 O GOSUB INPUT LOAD LIST LET PAUS
 E NEXT POKE PRINT PLOT RUN SAVE

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Contest

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Each winner will receive an author's contract and earn top royalties. Fill in the entry form below and while we will accept a cassette; it must be accompanied by a well-typed or beautifully hand-written listing. Your entry must reach us by June 10.

As a tie breaker, if one is necessary, we want you to complete this sentence in 25 words or less:

I ♥ my T/S 1000, ZX81 because

The usual rules, about the decisions of the editors being final and employees of ECC Publications or International Publishing & Software being ineligible, apply.

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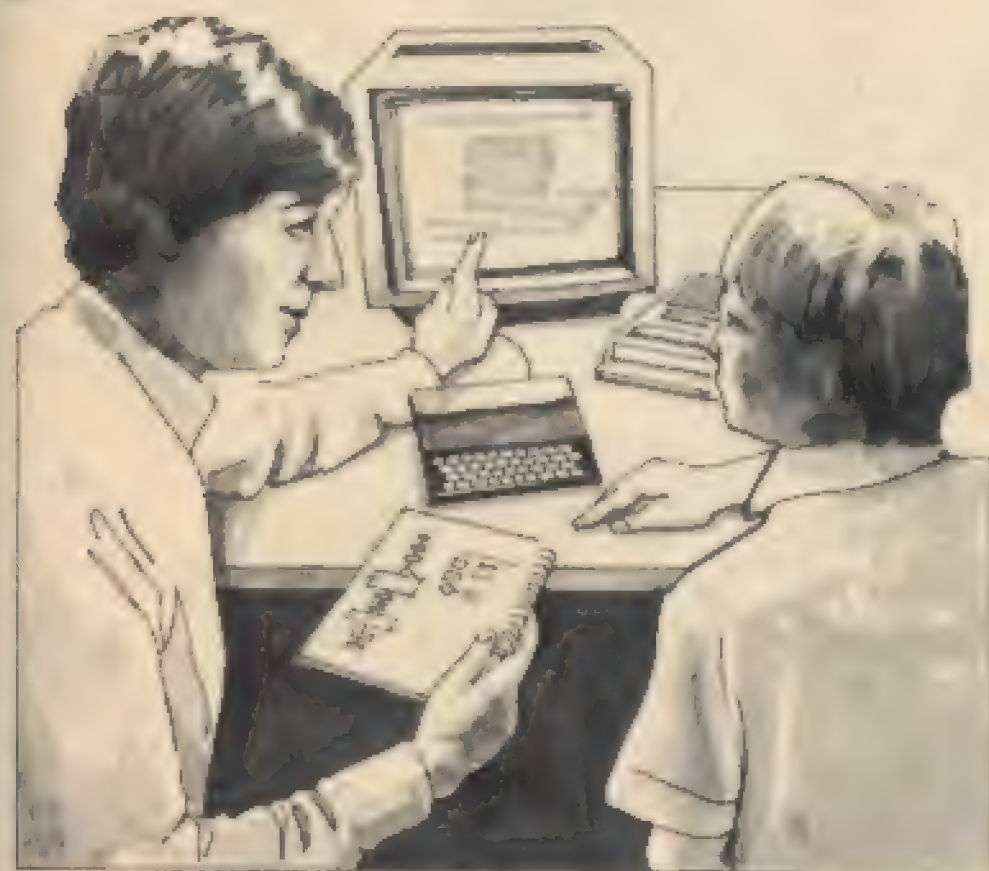
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R5. Protector — Defend your ship against oncoming missiles. Can you create the highest-ever score? (16K)

R6. Bomber — You must land, but not before all alien life forms are neutralized . . . but they want to neutralize you! (16K)

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**Program listing
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- ☐ A6. Escape From
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C3. Pilot — That's you. Can you land your plane safely in the dark? (16K)

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G1. Party Tricks — A range of programs with listings supplied, to give the novice an insight into the TS1000 BASIC. (1K)

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Let the structure flow and you are well on the way

Part one of our step by step guide to help turn every one of you users out there into expert programmers.

By John Gilbert.

ANY PROGRAMS written by beginners to computing show a lack of what professionals call structure. The structure of a program is the way in which it is put together and the order in which the code — the language in which it is written — is put down in the finished product.

This series will show the beginner how to structure programs so that they will work faster and occupy less memory. As an example of how the techniques work, a database will be constructed in the articles which can be used to store lists of information, such as names and addresses or telephone numbers. The information stored in the database can be called back by typing in a keyword which corresponds to the information sought by the user.

Before we start to do any coding it is important to know about flowcharting. A flowchart, such as the one in figure one, is constructed before coding to act as a guide to what the finished program will look like. If it is written after coding has been completed and before the programmer starts to search for errors — to debug the program — it will be an aid in finding redundant code or code which inhibits the flow of a program.

The program flow is the way in which the program will be executed. It is important to have that correct or errors will continue to occur on the program and the speed of the program will be slower.

The basic flowcharting symbols are the Input/Output box, operation rectangle and decision diamond and an example of each is shown in figure one.

The I/O box is used to mark places where an entry is made by the computer operator, or when the computer displays data on a screen

or printer. The box can be used for all forms of input including keyboard, joystick, or even punched cards on a large mainframe computer.

When debugging a program, checks for errors should first be made at those junctions in the flowchart as the boxes mark places where a user can crash a program by entering the incorrect information.

The decision diamond is the most complex operation box in a computer flowchart — and the most necessary. A computer is distinguished from other machines through its ability to make decisions based on information. Usually the processing of that information will provide a simple yes or no answer. The inflow to the diamond descends vertically and splits in two to provide the yes/no options.

The option which contradicts the program flow goes out to the side of the box and can be directed up, to form a loop until the action has been performed correctly, or down if alternative action is required to that of the normal flow.

Finally, the operation rectangle is used to show that the computer has to perform some kind of calculation. That may be adding numbers, assigning numbers to variables, or scanning a string of characters. The use of that and the other boxes is illustrated in figure one.

Flowcharts usually are constructed before writing a program but it is a good idea to draw up one

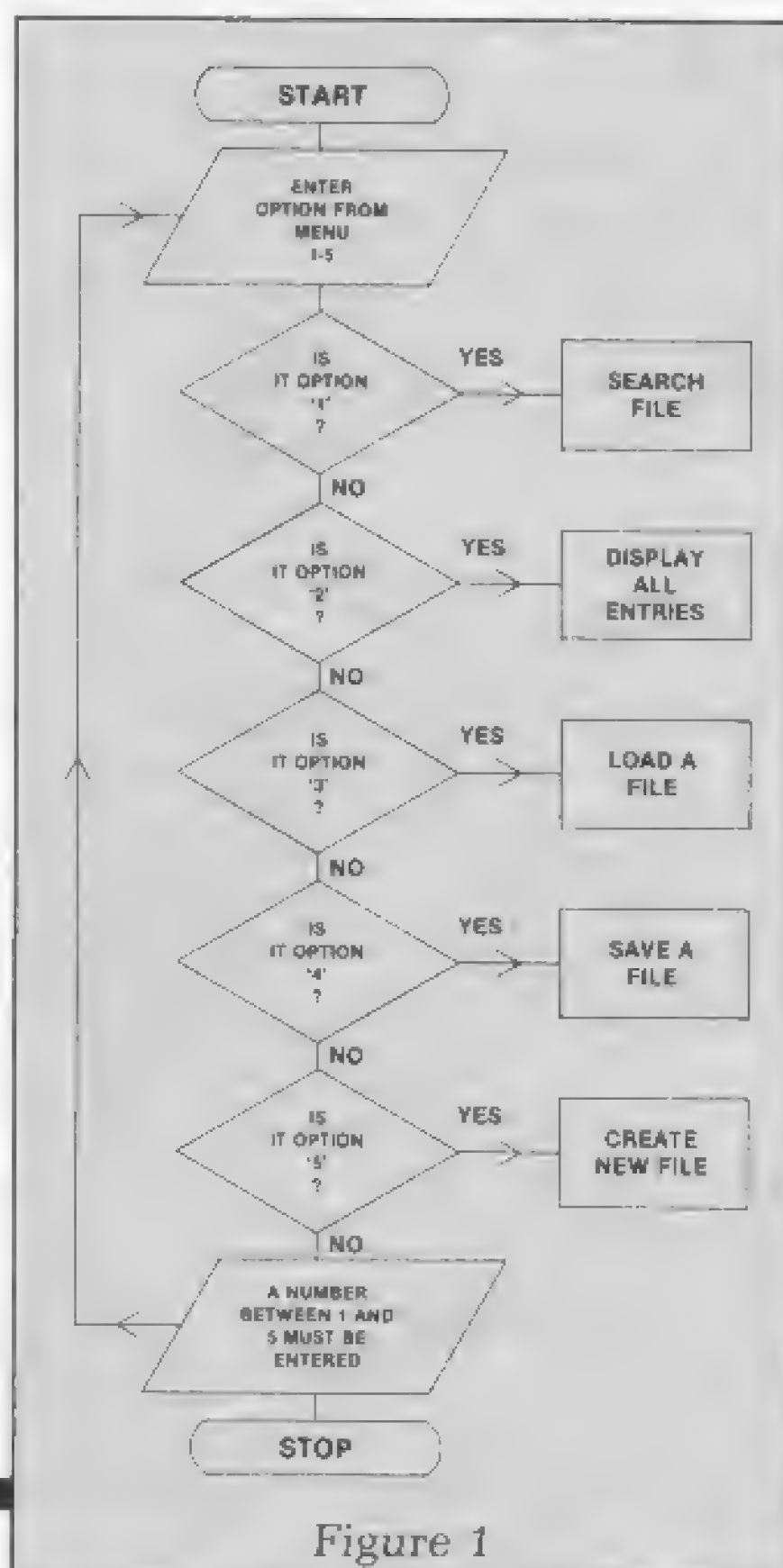


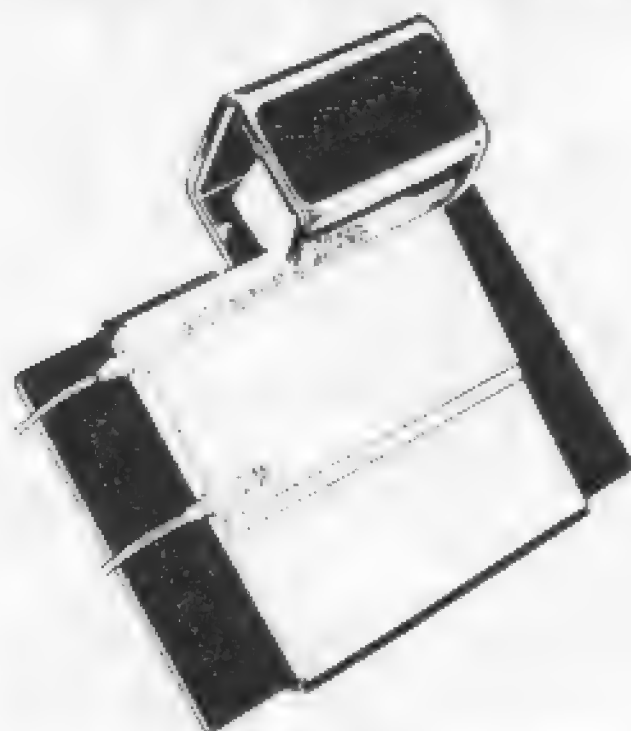
Figure 1

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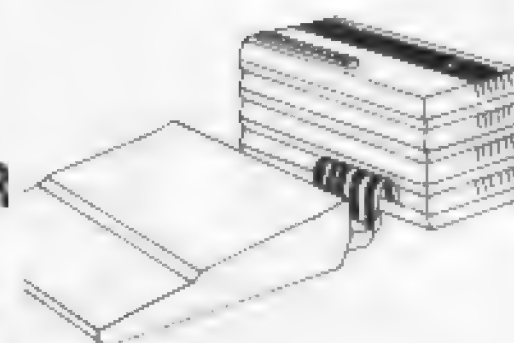
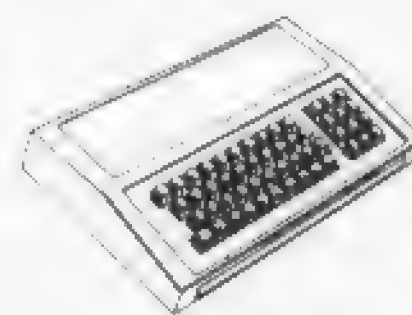
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TIMEX SINCLAIR USER

from the finished program to see if the program flows as it was originally intended.

When drawing a chart the boxes should be balanced as much as possible to the left and right of the main stem of the flow. The whole point of flowcharting is to create an easily understood diagram. The labels inside the symbols should be written in English and not in Basic.

The diagram in figure one uses several decision diamonds and they branch to both left and right. A flow on just one side of the diagram looks sloppy if there are more than two decisions to be made.

The way not to structure a flowchart is shown in figure two. The flow lines at the side have been run together, making it almost impossible to decide what happens next. That is remedied easily by making the chart longer and restructuring the lines into separate boxes as shown in figure three.

When writing a program it is a good idea to draw several flow diagrams. The first would be an overall plan showing the sections of program to be written and subsequent diagrams would expand each box to show the flow of the various routines.

A program is structured in a similar way to a flowchart. Most programs are constructed in the way figure one shows. The technique is called modular programming because the structure is broken into subroutines, or sections, called modules.

The reason is to eliminate as many GOTO statements as possible, or to make a GOTO statement jump only to a part of the routine in which it is situated, i.e., to make what is termed a local jump, or the control routine at the top of the program.

The control routine consists of a series of GOSUBs. It is the part of the program which is used most so it is the first thing that the computer encounters when scanning the program. In that way the program is faster in execution so it becomes more efficient.

A control routine can have two distinct structures. The first is used in a game-type program. That type of program will execute routines by going down through each of the GOSUBs in turn and then returning to the beginning.

The other type of structure is that which we shall use for the database. The program will first jump to the menu routine where the user will select an option. Control is then sent back to the control routine and using a series of IF... THEN statements, the program will go to the subroutine selected by the player. The control program will not go down through all the GOSUBs but jump only to those specified by the user through the menu.

The database will function using a keyboard recognition function. The user enters a few words which act as a key phrase. The program

will then look through the list, or file, of information in the program and, if a match is made between the key phrase and part of a piece of information, that piece of information will be output. The computer will output all information which is associated with the key phrase.

The program will also have to support separate data files and be user-friendly so that anyone can use it. The program menu will have search files, and create new files. The program structure will look like this from top to bottom, with the control routine at the top.

The complete flowchart of the database is shown in figure one. Using that chart it will be easy to translate each operation into program code.

Next month I will show how the overall structure of the program is finalized and then we can start coding.

2/8

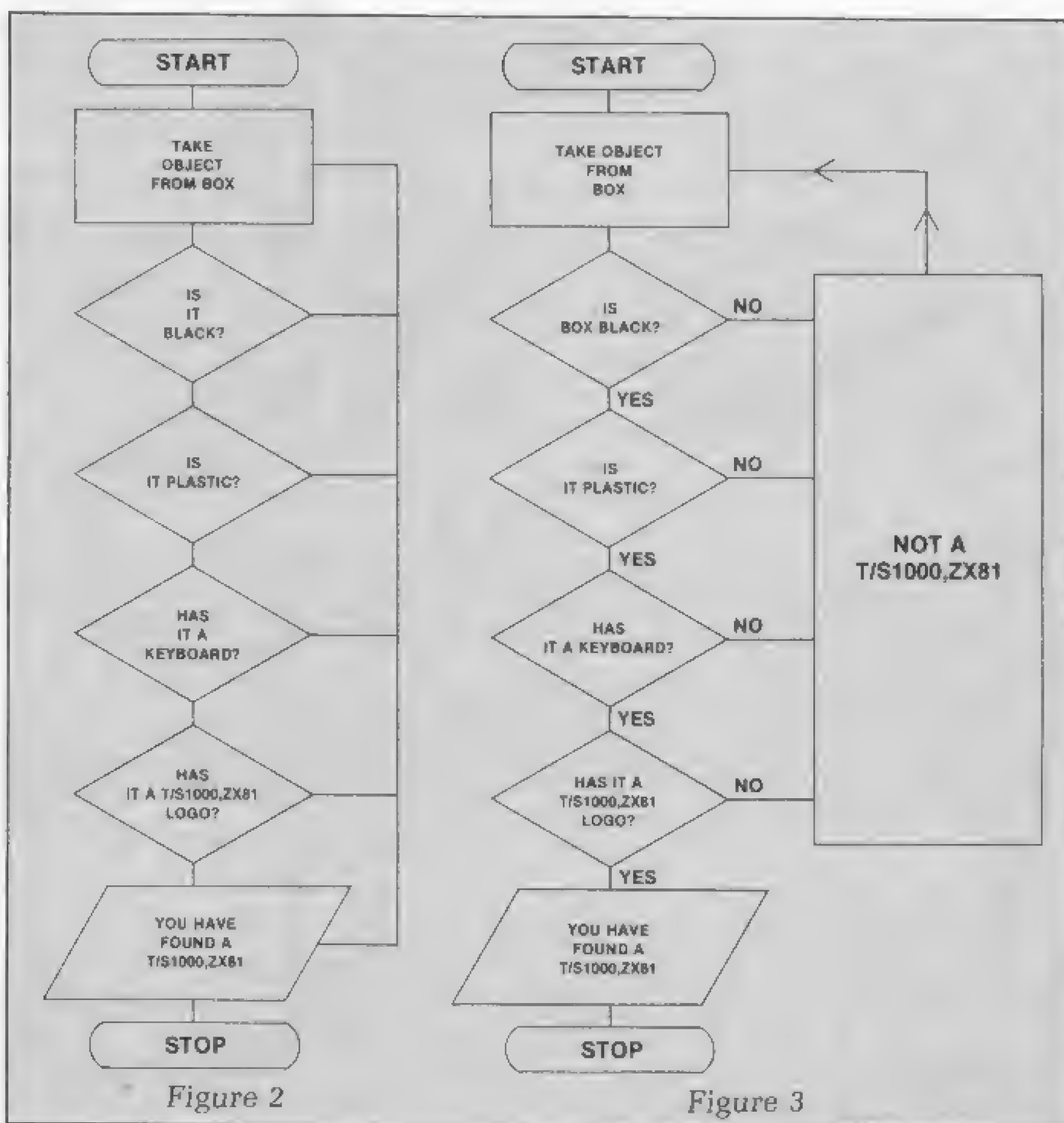


Figure 2

Figure 3

This book is clear, witty, useful

Timex Sinclair 1000: Programs, Games and Graphics

PROFESSOR Ian Stewart is with the University of Warwick, England, while co-author Robin Jones is with the computer unit at the South Kent College of Technology, England.

What kind of a book can we expect from two obviously intelligent gentlemen with a great knowledge of computers? Your first thought is a dry, dull, routine book that is understandable only to someone with a degree in computer sciences.

To our delight, *Timex Sinclair 1000: Programs, Games and Graphics* (published by Birkhausen), is an excellent book for any Timex Sinclair user — whether a beginner or more experienced hacker. With surprising wit, clarity and humor, the authors provide refreshing refuge from the terrors of the *Timex Sinclair Manual*.

The book starts with the admission that the Timex Sinclair isn't the most sophisticated machine on the market, but is an excellent system to get started in computing. Throughout the text, the authors sprinkle programs and programming examples (50 programs altogether) to encourage readers to start designing programs.

Chapter one starts with clear, precise instructions on setting up your system, hooking up the television, and other matters. Next comes a chapter on how to run

prepackaged programs, the basics of BASIC, arithmetic, and a chapter entitled: "Heeeellllppp!"

To break up continuity in the middle of the book, the authors have created a Timex Sinclair crossword puzzle. Finally, a comprehensive index allows the reader to refer back to special areas of the book.

This is the American edition of a book published in Britain as *Peek, Poke, Byte and Ram: A program guide for the Sinclair ZX81*. However, unlike many visitors from Britain, this new edition was completely updated for the North American market. New developments in references and

changes in Timex Sinclair technology were included in the revised edition.

The book is well designed, and contains excellent information for anyone digging into a Timex Sinclair computer system. Although we have not run the programs, the authors' titles indicate some fascinating possibilities. They include: Drunkard, Sink the Bismarck, Monopoly, Dice, Billiard Bounce, Macy's, Molehunt, Fruit Machine, Sinecurve, Brickbat and Linette (roulette played in a straight line).

Buy it! *Timex Sinclair 1000* will make a useful addition to your Timex Sinclair library.

Machine language simplified

Machine Language Made Simple For Your Sinclair ZX80 and ZX81

THE LACK of an author's name on *Machine Language Programming Made Simple For Your Sinclair ZX-80 and ZX-81* indicates it may have been prepared by a committee. We decided the

author was probably a comic art character used throughout the book to enliven the text. Dressed in a court jester's outfit, wearing a CPU chip T-shirt, the arty little character is helpful for the reader. The jester



frowns, smiles or looks confused to indicate the density of the text.

A disturbing number of typographical errors are sprinkled through the text. This is probably a result of the book being printed in Hong Kong, where proofreaders are not known for their mastery of English. However, these typos are so apparent that their presence should not keep you from purchasing the book.

The authors (or committee) get off to a good start in the first chapter with listings of advantages and disadvantages of machine language programming. The chapter ends with an excellent sentence summarizing machine language programming:

"It's hard, it's frustrating, it's inconvenient, but it's a wonderful practice and gives you a great insight into the way computers work."

The book is written for the

typical ZX81 or Timex 1000 user — someone with limited experience with a computer system. Next, the function of the CPU is explained, followed by information on computer counting and numbering systems used in machine coding, both binary and hexadecimal (HEX).

One problem with the book is the

"... in Hong Kong, proofreaders are not known for their mastery of English ..."

term "location." Sometimes this is referred to as a single byte of memory having 8 bits, or as the address (which is two bytes, 16 bits) of the data base.

Next, the court jester shows how data is manipulated, using his hands, feet, fingers and boxes for storage. Then, the ZX80 instruction

set is introduced in about a dozen groups containing several short program routines.

The final third of the 160-page book concerns programming in machine code and how it can be loaded into the ZX80, ZX81 and Timex 1000. For short routines hand assembly could be used. However, the longer routines would need an assembler-editor program to do the major coding.

The lengthy program at the end of the book is called "Checkers" in the United States and Canada, and "Draughts" in England.

The utility of the book is diminished by lack of a comprehensive index. Perhaps after a thorough study of the contents, a reader will know where to look for help with a specific program. Published by Melbourne House.

Q/Q

Books reviewed by Warren Smith and Harry Petheram

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Programming on the T/S1000,ZX81 can be frustrating. These 10 tips should help you get over some of the problems! For our first issue of Timex Sinclair User, we went to dealers, publishers and users for the most often asked questions about the T/S1000,ZX81. These questions and our answers are the contents of this column this month. For future issues, we will rely on you, the reader/user, to fill this space with your letters, questions and comments.

1

WATCH YOUR LEADS

THERE ARE two leads that join your tape recorder to the computer. One is used for saving programs, the other for loading. When you save or load a program, unplug the lead that you are not using. This prevents a feedback loop from forming with the computer which could cause corrupted saves and unsuccessful loads.

2

CLEAN TAPE RECORDER HEADS

ANY DIRT or residual magnetic field on the heads of your tape recorder could cause a corrupted save or load. It is important that you clean and demagnetize the heads on your tape recorder regularly. There are many good commercial cleaning kits on the market.

3

SAFE SAVES

ON MOST blank cassettes, there is a length of leader (non-usable tape) at the beginning. Wind the tape in the cassette past this leader. Turn the cassette forward until you can see recording tape (brown) before you start a save. This will insure that your save will start on recording tape and not on the leader nor on the join between the tape and the leader.

4

1K & 2K LOADS

IF YOU are experiencing difficulties loading 1K or 2K programs, try this. Remove the 16K RAM pack and try again. We agree that it shouldn't matter, but we have found that it often does... so give it a try!



better SAVEs and LOADs



.....5.....

OUTSIDE PROBLEMS

THE TS1000 and the ZX81 computers are easily affected by outside electrical interference. It is best, if you can, to set your machine up away from any large electrical appliance. Also, it is recommended that you not work on a metal table.

.....6.....

VOLUME SETTINGS ARE IMPORTANT

MOST TS1000 ZX81 users develop a mania for using one special "old reliable" tape recorder and one perfect volume setting to get consistently good loads and saves. We found that getting our machine to work well depended upon the time of day, the weather, the mood of the user, or whatever struck the machine's fancy. One factor that did help though, was adjusting the volume on the tape recorder. We suggest that you start at about $\frac{3}{4}$ volume and adjust it up or down until you find a comfortable setting for you and your machine. If you have a tone control, adjust it to full treble.

.....7.....

CLEARER TV PICTURE

OFTEN the computer is hooked up to the TV through a switch. Using a switch is convenient, but it may cause lines or fuzziness to appear on the screen. For a clearer TV picture, attach the TV lead from the computer directly to the U.H.F. or V.H.F. screws on the back of the set. First strip the end of the lead, making sure that the two wires that you find do not touch. Attach these

two wires to the screws on the back of your TV.

.....8.....

AVOID THE RAM PACK BLUES

MANY users have discovered the joy in using a RAM pack add-on to expand the useable memory in their computer. Most of these same people have also discovered the sorrow of working on a program for hours, only to lose it through a slight jiggle of the machine. That slight jiggle is all that it sometimes takes to cause the RAM pack to come loose. We tape ours on very solidly. We have seen some people using velcro to keep their RAM packs in place. Whatever method you use, be sure it stops those add-ons from becoming fall-offs!

.....9.....

BACK UPS, BACK UPS AND MORE BACK UPS

SAVE your programs regularly as you work. Label each save so you know which is the latest. For example, S1., S2., etc. The only rule around our office is in the sign that hangs over the computers: "PROGRAM SAVE EVERY HALF HOUR ... THE SANITY YOU SAVE MAY BE YOUR OWN!"

.....10.....

CHANGE TAPES

WE'VE saved the least important for last. Don't use the same tape cassette over and over and over again. They do wear out. Use a fresh tape if the program you are saving is important. A worn spot on the tape could be the cause of a lot of misery for you.

6/8

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Lifetime's obsession can easily be acquired

BUYING a T/S1000,ZX81 can be the start of a lifetime obsession with home computing. It is easy, however, to become discouraged if everything does not work according to the manual.

For those with only a little knowledge of computers and their capabilities, the best way to approach the T/S1000,ZX81 is to abandon any ideas for special uses. While the basic machine is ideal for learning how to use computers, it is too small for any major uses. It is better to become accustomed to the many facilities and then decide how you wish to use them.

Begin by unpacking the machine, overcoming your surprise at its size and weight and, following the manual, set up the system. If you cannot get the K on the screen, check that everything is plugged into its correct socket and re-set the machine by pulling out the power plug for a second and try tuning in again. If still nothing appears, check the power supply unit by shaking it. If it rattles, return it. If it is satisfactory, check your system with that of a friend.

Once the K appears you are ready to begin learning about the T/S1000,ZX81. It will save family arguments if you can afford a separate television set for your system. It also makes life easier if you have some place to leave your equipment set up permanently. You will find that a few power sockets are needed and a four-way block connector on a short length of extension cable will help to tidy trailing leads.

The manual is written in great detail and is reasonably easy to follow. Some of the chapters may not seem immediately relevant but it is worthwhile reading them since you might miss something which is important.

Come to the
T/S1000,ZX81 with
a clear mind to
make the best use
of your new
machine.

Patience is needed at this stage to learn the ways in which the computer will accept information. It is tempting to try to enter programs before you are really ready but that is likely to lead to errors. For example, words like AND, THEN, and AT should not be typed in letter by letter. By the time you have reached chapter 11, you should have accumulated sufficient knowledge to

be able to type in other people's programs, such as those in *Timex Sinclair User* without too much difficulty.

It is important not to lift the machine when it is in use. Some of the connections can easily work loose and everything which has been put in will be lost.

The manual is not to everyone's taste and if you find it difficult to follow, a number of books on the market can help you. Find the one which suits you best. There will be book reviews in every issue of *TIMEX SINCLAIR USER*.

As a way of relaxing, you can buy some of the growing range of commercially-produced software. These programs can be loaded directly from cassette but make sure that your machine is big enough to take the tapes you buy. There are some programs for the unexpanded 2K machine but most of them require a 16K RAM pack. Since the tapes vary in quality, it is advisable to read the reviews in *Timex Sinclair User* and use your judgment to find the best.

An alternative method to learn about the T/S1000,ZX-81 is to plunge in at the deep end and see what the computer will do. Refer to the manual when you have difficulties. You can ignore the functions and calculations initially and experiment with PRINT statements to obtain the feel of the machine.

You may have heard already about the problem involved in SAVEing and LOADING your own cassettes. The manual again gives detailed instructions but many of the early machines would not accept tapes from some recorders. That problem is said to have been overcome but there can still be difficulties.

These usually occur when LOADING tapes recorded by other people. One simple method to over-



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people. One simple method to overcome this is to wind the tape to the middle of the program and type LOAD " " followed by NEWLINE; then slowly increase the volume of the recorder with the tape running until the television screen shows four or five thick horizontal black bands. If you then rewind the tape, the program should LOAD normally.

Finally, a health warning. Apart from any practical uses, computing with your T/S1000,ZX81 can be a very entertaining hobby and is almost certainly habit-forming. You may easily find yourself crouched



over your machine, red-eyed, in the early hours of the morning, thinking that in another five minutes you will sort out the problem.

Try to break that habit by getting into the fresh air and meeting other Timex Sinclair users.

By obtaining a T/S1000,ZX81 you find that you have joined a not very exclusive club with thousands of members, many of whom would be only too happy to advise you if you have difficulties.

Make sure of your regular copies of *Timex Sinclair User* and you can be guaranteed many happy hours with your Timex Sinclair machine.

e/e